THE IRON TRADE REVIEW

VOLUME XXXVI. CLEVELAND, OHIO, SEPTEMBER 3, 1903 NUMBER 36

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

Definite developments in the iron trade are still lacking. The more optimistic sellers of foundry iron, which has been the best observed part of the market, find satisfaction in a considerably increased number of orders in the past 10 days; but carload buying does not run rapidly into tonnage, and indicates that consumers expect to follow rather than to make the market. The halt in the downward movement of foundry iron is perhaps the most noteworthy thing in the situation. For such business as is going the price seems pegged at $11.75 Birmingham for Southern No. 2. Even at this figure the Southern furnaces can scarcely compete with Northern iron in districts closest to Pennsylvania and Ohio furnaces, and a meeting of furnace operators and railroad representatives at Birmingham Sept. 4 will consider the request of the former for a reduction of 50 cents in freights to Northern points. Eastern furnacemen are asking a reduction on the coke rate, and if this is made Mahoning and Shenango Valley furnacemen will expect a readjustment of their freights to correspond with the decline in prices. The question will then come up, how far prices can recede before a readjustment of blast furnace labor cost will be necessary. Some inquiries for round lots of foundry pig iron have been received, but the large August buying by malleable foundries and by the leading agricultural machinery interest has not proved the starting of the procession. Northern foundry irons have sold at prices ranging from $15 to $15.50 at furnace for No. 2, Ohio River producers making low quotations. Charcoal iron has declined to a point leaving no profit for Southern sellers and a number of Southern makers are inclined to blow out their stacks. Bessemer pig iron is inactive and an accumulation of iron has begun at Valley furnaces, steel works requirements having fallen off. Central Western open-hearth and Bessemer plants are making smaller outputs, and the idleness of several of the former has led to an accumulation of heavy melting scrap, whereas one year ago there was practically a famine. Some sales of steel are reported, and there are rumors of prices below the basis recently established by steel manufacturers, but these cannot be confirmed though it is known that considerably more steel is being produced than is being rolled into finished forms. The situation in respect to various finished products remains substantially unchanged, with the tendency still toward easier prices. Probably 200,000 tons of bars are yet to be bought by agricultural interests, if their requirements for the coming year at all approximate those of last year. Eastern implement manufacturers have bought 20,000 tons of steel bars in the week, and 10,000 tons of shafting has been booked, but Western buyers still hold off. Bar iron has sold lower where any considerable tonnage was involved. On one Northern Ohio contract a price was made equivalent to 1.45c at mill and it is evident that cost is being reached on present prices for raw materials. Whether any considerable buying of steel bars will be seen at the pool price is a question engrossing the attention of both sides of the market, as some good sized inquiries are now up. The sheet market has shown some keen competition for business in the past week. Nothing has come of the Amalgamated Association's conference on the situation, the limit of output being retained in spite of the protests of independent sheet manufacturers, and no action being taken on the proposal to declare union mills open. The recent concession on large lots by the leading producer has been followed by lower quotations by independent mills. While there is a fair prospect for future structural contracts, current deliveries show the work of the strike as an arrester of prosperity. At Chicago two contracts of 1,000 tons each are being figured on. The wire and nail trades are active, the August shipments having been quite above expectations. Rail buying goes on steadily. Some business for traction lines is held back by financial considerations. The money and crop outlooks are given a good deal of weight, apparently, in the calculation of many buyers.

PITTSBURG.

OFFICE OF *The Iron Trade Review*, }
429 PARK BUILDING, Sept 2. }

Local mills have closed contracts during the week for nearly 20,000 tons of steel bars, for delivery within the next three to six months, the bulk of the tonnage being placed by the Eastern manufacturers of agricultural implements. A very small portion of this tonnage was placed by some of the Western implement manufacturers, but on the whole the heavy consumers of bars in that section of the country are displaying little interest in closing for future requirements despite the fact that the opening of their season is close at hand. The International Harvester Co. has closed for its season's supply of shafting and cold rolled stock during the week amounting to about 8,000 tons, while Eastern implement manufacturers placed orders for an additional 2,000 tons. Other finished lines have displayed no activity and the general condition of the trade is much as it has been for the past month. Tin plate and merchant pipe and tubing are holding up exceedingly well, and in the latter the demand continues to be above the normal. On sheets concessions have not yet been withdrawn by the largest producer, but independent mills are underselling this price by quoting on a basis of 2.65c for No. 28 gauge. The wire and wire nail market is very firm and the demand for cut nails is sufficiently strong to warrant reaffirming present prices, which was done at a meeting of the cut nail association held last Thursday. Specifications on structural shapes and plates are far below the productive capacity of the mills in this district, and owing to the falling off in the demand for steel cars, and the stagnation of the building trade a revival of trade in these lines is not anticipated much before the first of the year.

The steel production of this district has been further curtailed by the shutting down of the steel plant of the Clairton Steel Co., at Clairton, Pa. One of the open-hearth plants of the Carnegie Steel Co. in this district is also down and the plant at South Sharon also continues inoperative. By the closing of these plants the steel production of this and the Valley district is curtailed by fully 3,000 tons per day. The Clairton plant will not resume operations for four weeks, and no date has been set for resuming operations at South Sharon.

The recent decline in pig iron prices has resulted in a very general demand for a reduction in freight tariffs on the part of blast furnace operators. The Southern furnace operators will meet with the Southern railroad traffic association on Friday, Sept. 4, for the purpose of presenting reasons for a reduction in freight rates to Northern points of 50 cents a ton. The present rate to Pittsburg is $4.85 and despite the recent reductions in the price of Southern

iron, the tariff is so high that it is impossible to compete with the Northern producers. Eastern furnace operators are asking a reduction on coke tariffs and the Valley furnacemen and those in the West will also insist on a reduction if one is granted to the Eastern furnace operators. Tariffs on coke and pig iron were advanced by the railroads during the past two years as the prices of pig iron advanced, but since the decline of the past four months they have displayed no disposition to reduce them to what they were before abnormal prices ruled in the iron trade.

The pig iron market continues very quiet and transactions are limited almost entirely to small lots for immediate shipment. Northern No. 2 foundry is being freely offered and is sold in small lots at $16.50, Pittsburg, while forge is offered at $15.35 to $15.50. There is practically no market for Bessemer iron, although there have been offerings of small lots for early delivery at $16.50 at the furnace. Malleable iron has been quoted at the Valley furnace at $15, but there is practically no buying despite this very low quotation.

Pig Iron.—Of the thirteen furnaces idle in this district and the Valleys two weeks ago six have resumed operations, but the idle list has been increased by the blowing out of the old Spearman stack of the Shenango Furnace Co. at Sharpsville, Pa., for relining. This stack will be out for about six weeks. With few exceptions, the Valley furnaces are not receiving sufficient shipping orders to move their entire output and as a result some low prices are being made for the sale of this iron for immediate shipment. The furnace operators are also willing to close at these prices for delivery the remainder of the year, but they will not consider present quotations for delivery during the first and second quarters of 1904. No. 2 foundry is now being freely offered at $16.50, Pittsburg, while Southern No. 2 is held at $16.60, or $11.75 Birmingham. A few of the Valley furnaces outside of the Bessemer association are offering Bessemer at $16.50 at the furnace, and a few small lots have been sold at this price. We make the following quotations:

Bessemer, Valley	$16 50 to 17 00
Bessemer, Pittsburg	17 35 to 17 85
No. 1 Foundry	17 25 to 17 50
No. 2 Foundry	16 50 to 17 00
Gray Forge, Pittsburg	15 35 to 15 50
Chilled Basic, Valley	17 00 to 17 25
Chilled Basic, Pittsburg	17 85 to 18 10

Steel.—Owing to recent reductions in the price of Bessemer iron there is some doubt in the minds of steel consumers whether present quotations on billets, sheet and tin bars can hold. With a price of $9 for conversion the pool prices can be undersold from $1 to $1.50 per ton. While there have been persistent rumors that quotations have emanated from some of the mills in the association below the fixed basis, so far as can be ascertained all of the mills are adhering strictly to the present quotations. The buying of billets is limited entirely to small lots and the mills are not disposing of half of their surplus output. We quote: Bessemer billets 4x4 inches and slabs up to and including .20 carbon, $27, Pittsburg, Wheeling or Valley, Johnstown, Ashland, Ky., Ironton, O., and Lorain, O.; .21 to .60 carbon, $1 advance, and .61 to 1.00 carbon, $2 advance; open-hearth billets up to and including .60 carbon, $28, and over .60 carbon, $29; billets smaller than 3⅞-inch and sheet and tin bars are $1 per ton extra; Bessemer rods, $35.50 to $36 and open-hearth are held at $1 advance.

Ferro-Manganese.—We quote domestic 80 percent at $49, delivered in carload lots at buyer's mill. It is probable that this price could be shaded about $1 per ton.

Spelter.—Prime Western grades are firm and are held at 4.83½c to 4.85c, Pittsburg.

Muck Bar.—There is practically no buying and the market is held nominally at $29 to $30.

Skelp.—We note the sale of 2,000 tons of sheared iron skelp at 1.85c, Pittsburg. Grooved skelp is held at $1 less per ton, while steel skelp is quoted at 1.70c to 1.75c.

Rails and Track Material.—No additional large orders for steel rails have been placed during the week. At the present time the railroads are buying very little track material and the market is quiet. We make the following quotations: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 8 pounds, in carload lots, $39; less than carload lots, $40; 12 pounds, $33.50; 16 and 20 pounds, $32.25 to $33; 25 to 40 pounds, $32 to $32.50. Track material: Spikes, 2.05c to 2.10c; track bolts, square heads, 2.05c; hexagon heads, 2.65c; fish plates, 1.60c on orders accompanying large rail contracts, otherwise 2c to 2.10c is asked.

Plates.—The market is exceedingly quiet and specification from the steel car and shipbuilding trades continue very light. We quote as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plates more than 100 inches, 5c extra 100 pounds. Plate 3-16-inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5c extra a hundred pounds, for less than carload lots. Terms, net cash, in 30 days.

Bars.—Eastern agricultural implement manufacturers have placed contracts for nearly 20,000 tons of steel bars during a week. The Western manufacturers on the other hand are not buying, but will be compelled to place some tonnage within the next few weeks if only to cover immediate requirements. On bar iron local mills are quoting 1.75c uniformly, and the low prices prevailing in other districts of the country have not yet affected this territory. We quote: Bessemer steel bars, 1.60c; open-hearth, 1.70c; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer, under 3 inches, 1.70c; over 3 inches, 1.80c; common bar iron, 1.70c to 1.75c, Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots.

Structural Material.—The market continues very quiet and all the mills in this district can make deliveries in one or two weeks on current business. Quotations are unchanged as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 16 inches, 1.60c; universal mill plates, 1.60c.

Sheets.—Concessions offered the trade by the largest producer have not yet been withdrawn and independent manufacturers are cutting these prices by quoting for large lots on a basis of 2.65c for No. 28 gauge, black sheets. We make the following quotations on 500-bundle lots and over: No. 28, 2.65c to 2.70c; No. 27, 2.55c to 2.60c; No. 26, 2.45c to 2.50c; Nos. 22 and 24, 2.35c to 2.40c; Nos. 18 and 20, 2.25c to 2.30c; Nos. 14 and 16, 2.15c to 2.20c; Nos. 10 and 12, 2.05c to 2.10c. Galvanized: No. 16, 2.55c to 2.60c; No. 18, 2.80c to 2.85c; No. 26, 3.30c to 3.35c; No. 27, 3.55c to 3.60c; No. 28, 3.80c to 3.85c; No. 29, 4.30c to 4.35c; No. 30, 4.45c to 4.50c.

Pipes and Tubes.—Current demand continues above the normal for this season of the year and orders on hand will keep the mills in operation until the first of the year. We quote as follows in carload lots to consumers, f. o. b. Pittsburg, plus freight according to Tube Rate Book to destination:

MERCHANT PIPE.

	Steel Pipe. Black. Percent.	Steel Pipe. Galv. Percent.	Wrought Iron Pipe. Black. Percent.	Wrought Iron Pipe. Galv. Percent.
⅛, ¼ and ⅜ inch	68	58	65	55
½ inch	70	60	67	57
¾ to 6 inch	75	65	72	62
7 to 12 inch	69	59	66	56
Plugged and Reamed				
1 to 4 inch	73	63	70	60
Cut 3 to 6 feet				
⅛, ¼ and ⅜ inch	63	52	60	49
½ inch	65	54	62	51
¾ to 6 inch	71	60	68	57
7 to 12 inch	65	53	61	50
Cut 6 feet and longer				
⅛, ¼ and ⅜ inch	64	53	61	50
½ inch	66	55	63	52
¾ to 6 inch	72	61	69	58
7 to 12 inch	66	54	62	51
Extra Strong Plain End				
⅛ to 8 inch	67	57	63	53

Threads only	66	56	62	52
Threads and Couplings	65	55	61	51
Double Extra Strong Plain End				
½ to 8 inch	59	49	55	45
Threads only	58	48	54	44
Threads and Couplings	57	47	53	43

NOTE.—Orders for less than carload will be charged at 12½ percent advance. Extra and Double Extra Strong Cut Lengths, lower random discounts by 10 percent net for 6 feet and longer, and 15 percent net for 3 to 6 feet.

BOILER TUBES.

Steel.

	Percent.
1 to 1½ inches	45
2¼ to 5 inches	62½
1¾ to 2¼ and 6 to 13 inches	52½

Iron.

	Percent.
1 to 1½ inches	36½
2¼ to 5 inches	45½
1¾ to 2¼ and 6 to 13 inches	35½

CASING.

	S. and S. Percent.
2 to 2 inches	58
3¼ to 4 inches	60
4½ to 12½ inches	63

Wire and Wire Nails.—The wire and wire nail market is reported very firm and jobbers are already placing their orders with mills in anticipation of a heavy fall trade. At a meeting of the cut nail manufacturers held last Thursday ruling quotations were reaffirmed. The cut nail trade is reported in excellent condition and the demand is taxing the capacity of the mills. We reaffirm quotations as follows: Wire nails, carload lots, to jobbers, f. o. b. cars, Pittsburg, $2; plain wire, carload lots, $1.90; barb wire, carload lots, $2.30; staples, carload lots, $2.20. Galvanizing 30 cents extra. Carload lots to retailers are held at 5 cents advance in all lines, and on less than carload lots a further advance of 10 cents is charged. Steel cut nails are quoted as follows: Carload lots, $2.15, and less than carload lots, $2.20, f. o. b. Pittsburg, plus freight to point of destination. Iron cut nails are $2.25 in carload lots and $2.30 in less than carload lots. Terms, 60 days, less 2 percent off in 10 days.

Merchant Steel.—Contracts for upward 10,000 tons of shafting and cold rolled stock were placed by implement manufacturers during the week. This is the heaviest buying that the mills in these lines have experienced in the past four months. We quote: Turned cold rolled and ground shafting, 47 off in carload lots and 42 percent off in less than carload lots. Tire steel, 2.15c to 2.25c; spring steel, 2.25c to 2.35c; toe calk, 2.30c to 2.40c. Tool steel is quoted 7 cents and upwards, according to the grade.

Old Material.—Owing to the shutting down of a number of the large open-hearth plants in this district the accumulation of heavy melting stock is great and it is doubtful if there will be any considerable buying on the part of the large steel mills within the next three months. Other lines are very quiet and quotations are merely nominal.

Coke.—We note the sale of a round tonnage of strictly Connellsville furnace coke for delivery to the end of the year at $2 at the ovens. The range for this product is now from $2 to $2.50. Connellsville foundry coke is held at $2.75 to $3.25, while outside coke is held at $1.50 to $1.80 for furnace and $2.25 to $2.50 for foundry. For the week ending Saturday, Aug. 22, the production of the upper Connellsville region amounted to 244,895 tons as compared with 245,680 tons the previous week. The production of the lower region amounted to 50,595 tons.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, Sept. 1.

Trading in iron and steel in the past week has been largely in small lots. Confidence in present prices is not yet complete and the indications point to a continuance of the dragging market that has existed throughout the summer. Manufacturers have expected much from the turn of the month, and with a safer estimate on the crop outlook and the ending of the vacation period, are anticipating an active demand during September. Southern pig iron is still hovering between $11.50 and $12 Birmingham, and sales of Northern No. 2 are reported at $17 Chicago, with a moderately good buying. Interest in steel bars is growing. Contracts for several thousand tons have been let within the week, and inquiries for about 30,000 tons are pending. Many consumers have yet to cover for their requirements for the ensuing year, the amount of these prospective orders being placed at about 200,000 tons. Bar iron is without animation and prices are weak. There has been some movement in wire rods, a sale of 1,000 tons for delivery in Cleveland having been made on the basis of $36 Pittsburg. Bessemer billets have been moving more freely, purchases aggregating 4,000 tons. Wire products and tubular goods continue firm in tone, orders for both being in good volume. Sheets, plates and structural steel are quiet. Old material is still declining, sales being limited to such small lots as dealers require to complete existing contracts. Further inquiries are received for steel rails for next year's delivery, and there has been some buying of track supplies for shipment in the same period. Agricultural implement makers continue to place season contracts for merchant steel, though the tonnage is not large. An interesting order placed last week by the International Harvester Co. was for 6,000,000 feet of malleable chain of all sizes for deliveries during the year ending August, 1904. This company's contract for steel bars is still unsigned. The coke market shows no change, melters buying only for immediate needs.

Pig Iron.—The character of the business emanating from melters in this section may be judged from the statement of one seller, whose total sales for one day last week exceeded 1,000 tons, practically all of which was made up of carload orders. Small business is the rule, though the number of concerns covering for their requirements to December 31 is growing, several contracts for lots ranging from 1,000 to 4,000 tons having been booked during the week. Association furnaces are now accepting business on the basis of $11.75 Birmingham for No. 2 foundry for future shipment, and a number of melters have placed contracts for their yearly requirements at this figure. These are isolated cases, however, the general tendency being to wait on contract business for $11.50, which is the quotation made by some independent producers. Only small lots for spot shipment are now selling at $12 Birmingham. Further sales of malleable Bessemer are reported on the basis of $17.50, and of local foundry irons at $17 Chicago. Silvery and high silicon irons have been in good demand in small lots at prices noted below. Quotations are as follows:

Lake Superior charcoal	$20 50 to 21 50
Local Coke Foundry No. 1	17 50 to 18 00
Local Coke Foundry No 2	17 00 to 17 50
Local Coke Foundry No. 3	16 50 to 17 00
Local Scotch Foundry No. 1	17 50 to 18 00
Southern Coke No. 1	16 60 to 16 85
Southern Coke No. 2	16 10 to 16 35
Southern Coke No. 3	15 65 to 15 85
Southern Coke No. 4	15 10 to 15 35
Southern No. 1 soft	16 60 to 16 85
Southern No. 2 soft	16 10 to 16 35
Southern Gray Forge	14 85 to 15 10
Southern Silveries (4% to 5% silicon)	18 35 to 18 85
Southern Silveries (5% to 6% silicon)	18 85 to 19 35
Jackson Co. Silveries (6% to 8% silicon)	20 30 to 21 30
Jackson Co. Silveries (8% to 10% silicon)	21 30 to 22 30
Ohio Strong Softeners	21 00 to 22 00
Alabama and Georgia Car Wheel	25 35 to 26 35
Malleable Bessemer	17 50 to 18 00
Basic iron	16 35 to 17 35

Billets.—Local mills report sales of 3,000 tons of Bessemer billets; another lot of 1,000 tons and several carload orders, together with a small quantity of open-hearth and forging billets. A deal for 1,000 tons of wire rods for delivery at Cleveland was also closed on the basis of $36 Pittsburg. Our quotations are without change at $28 for Bessemer, $29 for open-hearth and $32 for forging, carload lots.

Bars.—An active inquiry has set in for steel bars, orders pending running into five figures. The demand seems to be growing from week to week, and with the announcement of the letting of the International Harvester Co.'s order, it is expected there will be more brisk buying. Consuming interests representing about 200,000 tons have not yet covered for their requirements, having withheld their orders in the hope of a cut in prices. None being forthcoming, a buying movement is expected to start in earnest this month. Bar iron shows no change either in strength or demand. Orders for small lots for quick shipment preponderate, few buyers contracting for deliveries longer than thirty to sixty days ahead. We quote mill shipments, Chicago delivery: Iron, 1.55c to 1.60c; Bessemer steel, 1.76½c; angles, less than 3x3, 1.86½c base; hoops, in lots of 250 tons and greater, 2.06½c; less than this amount, 2.16½c. Quotations from store, less than carload lots: Steel, 2c; iron, 2c to 2.10c; hoops, 2.30c to 2.40c; angles, 2.10c rates.

Sheets.—There is no marked change in the situation, sales being of light volume. Quotations of the leading interest on black sheets, mill shipments, f. o. b. Chicago, are for No. 27, 2.81½c to 2.91½c; No. 28, 2.91½c to 3.01½c. Other producers are offering these sizes at the following prices: No. 27, black, 2.75c to 2.85c; No. 28, 2.85c to 2.95c. Galvanized sheets from mill, carload lots, Chicago delivery, are quoted 75 and 10 to 75 and 10 and 2½ percent. On lots from store, we quote No. 27 black, 2.90c to 3.05c; No. 28, 3.05c to 3.15c. Galvanized, 75 to 75 and 5 percent.

Plates.—Demand has not been of heavy volume during the week under review, due in some cases to the inability of mills to give desirable shipment. Store trade is active. We quote mill prices, Chicago delivery: Tank steel, ¼-inch and heavier, 1.75c; flange steel, 1.85c. Prices for lots from stock, tank steel, ¼-inch and heavier, 2c to 2.10c; 3-16, 2.10c to 2.15c; No. 8, 2.15c to 2.20c; No. 10, 2.30c to 2.35c; flange steel, 2.40c to 2.50c.

Structural Material.—The market is quiet and local business is light. Several contracts for structural work in other cities are being figured, among which are 1,000 tons at Denver and a like amount at Indiana Harbor, Ind. Buying from warehouse stocks is fairly brisk. We quote mill shipments, Chicago delivery, as follows: Beams and channels, 16 inches and under, 1.75c; 18 inches and over, 1.85c; universal plates, 1.75c; angles, 3x3 and larger, 1.75c; tees, 3x3 and larger, 1.80c; zees, 1.75c. Lots from store, 2.10c to 2.25c per 100 pounds, rates.

Merchant Steel.—Implement makers continue to place contracts with mills for their season requirements in the products listed below. Specifications are of good volume and the outlook for business is satisfactory. We quote mill shipments, Chicago delivery, as follows: Spring steel, 2.65c to 2.75c; sleigh shoe, 1.95c, flat sizes; concave and convex, 2.25c; cutter shoe, 2.50c to 2.60c; machinery steel, 2.15c to 2.25c base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.35c to 2.45c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; special, 13c and upwards; less than carload lots, 5 and 10 percent higher; cold rolled shafting, carload lots, 47 percent off; less than carload lots, 42 percent off.

Merchant Pipe.—Mills report a satisfactory trade with no change in prices. We quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛ to ¼ in. inclusive	66.35	56.35	63.35	53.35
½ inch	68.35	58.35	65.35	55.35
¾ to 6 inches	73.35	63.35	71.85	61.85
7 to 12 inches inclusive	67.35	57.35	64.35	54.35

Less than carload lots, 12½ percent advance over above prices.

Boiler Tubes.—Both mills and jobbers report there is a brisk demand for steel and iron pipe, and that specifications are unduly heavy. Prices are without change.

	L. W. Steel. Percent.	C. C. Iron Percent.
1 to 1½ in.	43.35	38.35
1¾ to 2½ in.	55.85	35.85
2¾ to 5 in.	60.85	45.85
6 to 13 in.	55.85	35.85

For lots direct from warehouse stock:

	L. W. Steel. Percent.	C. C. Iron Percent.
1 to 1½ in.	40	35
1¾ to 2½ in.	50	32½
2¾ to 5 in.	57½	42½
6 to 13 in.	50	32½

Cast Iron Pipe.—While no large orders have been closed or are pending, the small business from gas and water companies, railroads, etc., is of a very active nature, and keeps manufacturers busy. The leading interest reports a scarcity of cars at all its plants, seriously interfering with its shipments. Carload lots are quoted f. o. b. Chicago, 4-inch water pipe, $31; 6-inch, $30; 8-inch and upwards, $29; gas pipe, $1 a ton higher.

Rails and Track Supplies.—Inquiry for light and heavy rails continues to be of fair proportions, and every week sees additions of several thousand tons to the books of local producers. There has been some interest developed for track supplies for next year's shipments. We quote standard sections 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality, rails, $27; 25-pound rails, $32 to $34; 12-pound rails, $39 to $40, with regular differentials for intermediate sizes. Track supplies, mill shipments: Angle bars, 2c to 2.10c; spikes, first quality, 2.20c (out of store, carload lots, 2.25c to 2.35c rates); second quality, 2.10c; track bolts, 3½x¾ with square nuts, 2.85c to 3c per 100 pounds; with hexagon nuts, 3c to 3.10c, with usual differentials for other sizes.

Wire and Wire Nails.—Mills report a heavy demand for nails and open fencing, and an improved inquiry for barbed wire and fencing. Southwestern points are supplying the bulk of the business owing to the earlier crops in that section, but the trade from Northwestern points gives promise of large proportions. Crop reports from this latter territory are favorable as to the yield, and jobbers and dealers are laying in ample stocks in view of same. Quotations to jobbers, Chicago delivery, follow: Wire nails, carload lots, $2.20; less than carload lots, $2.30. Cut nails, steel, carload lots, $2.26½; less than carload lots, $2.36½. Plain wire, $2.10 carloads, and $2.20 in small lots; galvanized, carloads, $2.40; smaller lots, $2.50c. Barbed wire, carloads, $2.50; less than carloads, $2.60; galvanized, carloads, $2.80; less than carloads, $2.90; staples, carloads, $2.30; smaller lots, $2.40; galvanized, carloads, $2.60; small lots, $2.70. Bale ties, 82½ and 5 percent discount f. o. b. Waukegan on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet or DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

Coke.—Buyers are displaying little interest in the market, contenting themselves with purchases for prompt shipment. The supply from ovens is liberal, and the anomaly of spot coke selling lower than contract coke still prevails. We quote guaranteed Connellsville, 72-hour coke, under 1.00 sulphur and running 8 to 12 percent ash, f. o. b. Chicago, $5.65 to $6.15; Virginia and West Virginia grades as follows: New River, $4.65 to $5; Pocahontas, $4.65 to $5; Stonega, $4.85 to $5.25.

Old Material.—There is no change in the scrap market and prices are still weak and of a declining nature. Mills are out of the market and other buyers are scarce. We quote dealers' selling prices for gross tons as follows:

Old iron rails	$17 50 to 18 00
Old steel rails (mixed lengths)	14 50 to 15 00
Old steel rails (long lengths)	16 00 to 16 50
Relaying rails	28 50 to 30 00
Old wheels	17 50 to 18 00
Heavy melting steel	14 00 to 14 50
Mixed country steel	12 00 to 12 50

The following are selling prices per net ton:

No. 1 R. R. wrought	$13 50 to 14 00
No. 2 R. R. wrought	12 00 to 12 50
Shafting	14 50 to 15 00
Dealers' forge, No. 1	12 00 to 12 50
No. 1 busheling and wrought pipe	11 00 to 11 25
No. 1 cast	14 00 to 14 50
Heavy cast (300 pounds and over)	10 00 to 10 50
Agricultural malleable	13 50 to 14 00
Iron axles	19 00 to 19 50
Steel axles	17 00 to 17 50
Cast borings	5 50 to 6 00
Mixed borings, etc.	5 50 to 6 00
Wrought turnings	10 50 to 11 00
Machine shop turnings	10 50 to 11 00
Iron axle turnings	10 75 to 11 25
Steel axle turnings	10 75 to 11 25
Stove plate and light cast scrap	10 00 to 10 50
Old iron splice bars	14 25 to 15 00

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Sept. 1.

The past week has witnessed an improvement in the foundry iron market for early delivery, but there has been no heavy buying. Extreme dullness prevails in finished material, with continued tendency downward of prices, especially on bar iron.

Iron Ore.—Tonnage has been in excess of demand for a week, but freight rates remain stationary. Shippers, realizing that many vessels would tie up rather than accept cargoes at lower rates, have not made any effort to make contracts at lower figures. There seems now to be no prospect of any considerable buying of ore this fall.

Pig Iron.—There has been an encouraging increase in buying of foundry iron, orders for spot being numerous and requests for prompt delivery urgent. Some Southern furnaces now refuse to take orders below $12 for No. 2, but $11.75 is the usual price for desirable business. South-

ern Ohio is selling at $15 to $15.50, Ironton, the latter being equivalent to $16.95 Cleveland. The asking price for No. 2 Valley is $16.85 Cleveland, but business has been done below this. Gray forge is quoted at $10.50 Birmingham. Lake Superior charcoal is selling at $19 to $20 Cleveland, the price having come down in sympathy with coke iron. There is still a large tonnage on old contracts undelivered, which, if taken by customers, will absorb the output of some large producers to Nov. 1. Several thousand tons of malleable iron has recently been sold for delivery from October to March. We quote Cleveland delivery, save in the case of gray forge, on which the quotation is at Valley furnace:

Bessemer	$17 60 to 17 85
No. 1 Strong Foundry	17 25 to 17 75
No. 2 Strong Foundry	16 50 to 17 00
No. 3 Foundry	16 00 to 16 25
Scotch No. 1	17 25 to 17 75
Scotch No. 2	16 75 to 17 00
Gray Forge, Valley furnace	15 00 to 15 25
Lake Superior charcoal	19 00 to 20 00

Coke.—There is now much complaint about railroads not furnishing cars. The price of Connellsville foundry ranges from $2.90 to $3.50 according to the amount of sulphur.

Finished Material.—The market is very dull and there is keen competition for the little business. Bar iron has been reported as sold as low as 1.49¼c, delivered in Cleveland. For desirable business the price at the mills in Toledo, Cleveland, and Youngstown ranges from 1.50c to 1.55c. This is said to be very near cost at present prices of scrap. The question how long bar iron will continue to decline before compelling a reduction of the price of steel, which has so long been 1.60c for Bessemer and 1.70c for open hearth Pittsburg, is interesting both buyers and sellers, and the uncertainty is limiting the purchases of steel. It is recognized that if the price of steel declines, prices of all kinds of finished material will fall, but sanguine sellers expect that a buying movement will soon set in to check the present downward tendency. Inability of certain traction companies to finance their enterprises is delaying the purchase of rails for which it was expected orders would be placed this summer. Sheets are dull and independent interests are now cutting $2 per ton below the prices of the principal producer. On sales made through jobbers, the prices for the principal products are unchanged as follows: Galvanized sheets, mill sales, carload lots, Nos. 10 and 11, 2.60c; Nos. 12 to 14, 2.70c; Nos. 18 to 21, 3c; Nos. 22 to 24, 3.20c; Nos. 25 and 26, 3.55c; No. 27, 3.80c; No. 28, 4.05c; No. 29, 4.45c; No. 30, 4.95c. Galvanized sheets out of stock are quoted 75 and 5 off. For 3-16-inch black sheets and heavier we quote 2.15c, Cleveland. Mill sales of black sheets to consumers are made on the following basis: No. 24, 2.65c to 2.75c; No. 26, 2.75c to 2.85c; No. 27, 2.85c to 2.95c. The following are prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.50c to 2.60c; No. 16, 2.60c to 2.70c; Nos. 18-20, 2.75c to 2.85c; Nos. 22-24, 2.85c to 2.95c; Nos. 25-26, 2.95c to 3.05c; No. 27, 3.05c to 3.15c; No. 28, 3.15c to 3.25c.

Old Material.—Very few sales are being made, as mills are buying only to meet immediate demands. Prices are unchanged.

We quote, all gross tons, f. o. b. Cleveland:

Old iron rails	$19 00 to 20 00
Old steel rails (over 6 feet)	17 00 to 18 00
Old steel rails (6 feet and under)	17 00 to 18 00
Old car wheels	17 00 to 18 00
No. 1 R. R. wrought	16 50 to 17 50
Mill scrap	14 00 to 14 50
No. 1 machine cast scrap	14 00 to 14 50
Iron axles	22 00 to 23 00
Steel axles	22 00 to 23 00
Axle turnings	14 00 to 15 00
Wrought turnings (free from cast)	12 00 to 13 00
Cast borings	6 50 to 7 00
Uncut wrought iron boilers	9 00 to 10 00
Steel boiler plates	14 00 to 15 00
Grate bars	10 00 to 12 00
Pipes and flues (clean)	13 00 to 14 00
Tank iron	13 00 to 14 00
Hoop and band iron	10 00 to 12 00
Sheet iron	8 00 to 9 00
Wrought drillings	12 00 to 13 00
Malleable iron (railroad)	17 00 to 18 00
Malleable iron (agricultural)	14 00 to 15 00
Stove plate	10 50 to 11 00
Heavy steel	15 00 to 16 00

CINCINNATI.

Sept. 1.

The coke market is quiet and unchanged. Sales of foundry coke are on the basis of $2.75 to $3 f. o. b. ovens. The tone of the market is easy. Bar iron prices are lower on desirable orders. Pig iron is easy but there is a continued fair demand for early shipment.

Pig Iron.—While there has not been any important change in the appearance of the market the past week it is to be noted that where $11.75 seemed to be the inside a week ago it is now certain that $11.50 Birmingham for No. 2 foundry has been done and a sale of 1,000 tons of No. 2 foundry and No. 2 soft is reported on this basis. It is also noted that except for favorite brands in small lots the $12 basis is not obtainable. There has not been much falling off in the demand and quite a number of orders are being booked from car lots up to 300 tons. Large inquiries covering future requirements are not frequent, still a northern Ohio pipe manufacturer is asking for quotations on 2,000 tons per month for the next five months. Another inquiry is for 3,000 tons of malleable for deliveries extending through the last half of 1904. Another Ohio consumer is asking for figures on 500 tons, but aside from these inquiries buyers are proceeding on cautious lines. There are a number of orders accompanied with the request that they be rushed through, indicating that the buyer has held off as long as possible. Buyers are not disposed to combat the present price basis on small orders (that is, $11.75), but there is still a well defined inclination to buy only for current needs under the belief that it will be to their advantage to wait. The large stocks of iron known to have accumulated at Southern furnaces are regarded as a safeguard against any advance in prices and buying from hand to mouth is the order of the day. In Northern irons there has been no change in prices and the market is easy at $14.75 to $15 f. o. b. furnace in the Ironton district for No. 2. Gray forge is dull and easier. There are offerings of this grade at $10 Birmingham for either prompt shipment or extended deliveries.

The following are the prices current, f. o. b. Cincinnati:

Southern Foundry No. 1	$15 25 to 15 75
Southern Foundry No. 2	14 75 to 15 25
Southern Foundry No. 3	14 50 to 14 75
Southern Foundry No. 4	14 00 to 14 50
Southern Foundry No. 1 soft	15 25 to 15 75
Southern Foundry No. 2 soft	14 75 to 15 25
Gray forge	13 25 to 13 50
Northern Foundry No. 1	16 15 to 16 65
Northern Foundry No. 2	15 65 to 16 15
Southern car wheel iron	26 25 to 27 25

Finished Material.—The market is easy in tone and on any large orders there is enough competition to bring about concessions. Large consumers are generally covering only current wants which makes the jobbing demand fairly good. Some low quotations are said to have been made on iron bars and 1.65c base can be shaded on good sized orders. Steel bars remain at 1.73c base, half extras, with the retail price 2c base, half extras, for iron and steel out of store. Galvanized sheets are being quoted at 75 and 5 percent off. We quote black sheets No. 27 at 2.78c in car lots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 3.05c; No. 27, 2.95; No. 16, 2.55c; No. 14, 2.45c; No. 12, 2.40c; No. 10, 2.30c. Tank plates are firm and sell out of store at 2.15c for ¼-inch and 2.25c for 3-16-inch. Beams and channels are quoted at 2.15c to 2.25c from stock, and angles at 2.15c and 2.25c for base sizes.

The merchant pipe market continues steady with a quiet trade but there is no disturbance in prices. Jobbers are not stocking up and the sales are mainly for small lots.

MERCHANT PIPE.

(Basing Discounts.)

	Steel Pipe.		Guaranteed Wrought Iron Pipe.	
	Black. Percent.	Galv. Percent.	Black. Percent.	Galv. Percent.
⅛, ¼, ⅜ inch	66.7	56.7	63.7	53.7
½ inch	68.7	58.7	65.7	55.7
¾ to 6 inch, inclusive	73.7	63.7	70.7	60.7
7 to 12-inch, inclusive	67.7	57.7	64.7	54.7

BOILER TUBES.

	Steel Percent.	Iron Percent.
1 to 1½ inch	41.2	35.2
1¾ to 2½ inch	54.2	34.2

2¾ to 5 inch	59.7	44.2
6 to 13 inch	54.2	34.2

Old Material.—The market continues quiet with no change in prices. We quote:

Old No. 1 railroad wrought, net tons	$14 00 to 15 00
Cast machine and foundry, net tons	12 00 to 12 50
Old iron rails, gross tons	19 00 to 20 00
Old steel rails, gross tons	17 00 to 18 00
Old short lengths, gross tons	14 50 to 15 50
Old iron axles, net tons	20 00 to 21 00
Stove plate, net tons	9 00 to 9 50
Wrought turnings, net tons	11 00 to 11 50
Cast borings, net tons	6 00 to 6 50

PHILADELPHIA.

Sept. 1.

The amount of business forthcoming is disappointing and the opinion prevails that if prices become firmer, it will be due more to decreased output than to increased demand. Orders are numerous, but for small lots. The feeling of uncertainty is as marked as ever.

Pig Iron.—The feeling is not one of confidence. Sales are more numerous, but tonnage is light. Gray forge and basic are somewhat lower than they were a few weeks ago. The foundries are in better condition than the mills. Decreased production of pig iron is expected. We quote as follows:

No. 1 X foundry, $18.00 to $18.50; No. 2 X foundry $16.75 to 17.25; No. 2 plain, $15.75 to 16.25; gray forge, $15.25 to $15.50; basic, $15.50 to 16.00.

Steel.—German steel is offered at low figures. The market is not satisfactory and there are indications that the billet pool is not maintaining official quotations. Local steel brings $28.50 to $29 in small lots, but in 1,000-ton lots and upwards German could be done at $27 on dock, duty paid.

Finished Material.—Orders are for small lots, especially for structural shapes and bars. The entire situation is uncertain. We quote: Plates in small lots, 1.80c to 1.85c; carload lots, ¼-inch and thicker, 1.75c to 1.80c; flange, 2c; marine, 2.10c to 2.15c; finebox, 2.20c to 2.25c. Bars in carloads are usually quoted at 1.60c to 1.65c for refined iron and 1.73½c to 1.75c for steel bars. Structural Material.—Beams, angles and channels, ordinary sizes, 1.73½c to 1.80c for carload lots, with the usual addition for smaller quantities.

Old Material.—The market is dull and prices unchanged. We quote: Old steel rails, $17.00 to $17.25; miscellaneous heavy steel scrap, $16.50 to $16.75; low phosphorus scrap, $24.00 to $25.00; old steel axles, $19.00 to $20.00; old iron axles, nominal, $20.00 to $21.00; old iron rails, nominal, $19.00 to $20.00; old car wheels, nominal, $19.00 to $20.00; choice scrap R. R. No. 1 wrought, $16.50 to $17.00; country scrap, $14.00 to $15.00; machinery cast, $15.00 to $16.00; No. 2 light scrap (forge), $15.00 to $16.00; No. 2 light scrap (ordinary), $11.00 to $12.00; wrought turnings, $12.00 to $12.50; wrought turning, choice heavy, $13.00 to $14.00; cast boring, $8.25 to $8.75; stove plate, $11.50 to $12.00.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, No. 150 NASSAU ST., Sept. 1.

Pig Iron.—Little change has taken place in the situation. Buying continues good, but sales agents say it is always in small lots, with requests that early delivery be made. Attempts have been made to get large consumers to enter the market, but even with the most liberal inducements offered, they show no disposition to take hold. They have concluded that nothing is lost, even though nothing is gained, by allowing the market to take its course, and be in a position to avail themselves of any development in their favor.

Prices only hold firm where a hand-to-mouth policy is pursued, but a large buyer can easily secure concessions. Advices from Birmingham are that the associated schedule is being shaded by independent furnaces, the figures ranging from $11.50 to $11.75 for No. 2 foundry, Birmingham basis. Generally the associated furnaces adhere to $12, but there is an understanding that they will meet $11.75 when necessary. In Northern irons a fair activity is noted, with prices a shade easier. Some furnaces manifest little or no interest in seeking new business under present conditions. The old material market is in a most unsettled condition and there is practically no demand for scrap of any kind. There is scarcely a dealer who cannot speak of deliveries on old contracts being rejected, and some have gone out of business. New York prices on pig iron are as follows: Northern No. 1 X foundry, $17 to $17.50; No. 2 X, $16.50 to $17; No. 2 plain, $16.25 to $16.50; Southern No. 1 foundry, $16.25 to $16.75; No. 2 foundry, $15.75 to $16.25; No. 3 foundry, $15.25 to $15.75; No. 4 foundry, $14.75 to $15.25.

Finished Iron and Steel.—The market for all kinds of finished material has been quiet. In structural shapes small business is the rule, although some large propositions from railroads for bridge work next year, are said to be in a fair position to reach the trade, shortly. Independent interests are engaged in a sharp lookout for business, and stories are afloat that they're not unwilling to lower prices to get it. The plate situation continues unsatisfactory, and not a few mills are reported as having about filled all the orders on their books. Sheets show further cutting by independent interests, with prices generally easier. Bars we understand are weakening, and demand is far from equal to capacity. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches, 1.75c to 1.90c; zees, 1.75c to 1.90c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 1.80c to 1.90c; flange, 1.90c to 2.10c; firebox, 2.10c to 2.20c; refined iron bars, 1.75c to 1.80c; soft steel bars, 1.70c to 1.75c; steel sheets, in car loads, New York, No. 28, black, 2.90c to 3.05c; galvanized 75 and 2½ off.

BIRMINGHAM, ALA.

Sept. 1.

There is a very good demand now for pig iron at $11.75 for 2 Foundry, while some sellers are able to obtain $12 for their brands, though none of the buying extends over sixty days. The fact that buying has begun, however, even though for only limited deliveries, encourages the makers to hope for a good period of business. The Southern Iron Committee will hold a meeting here on Friday, the 4th inst., looking to a reduction of 50 cents per ton in freight on pig iron to the Northern gateways. If the producer gets this concession from the railroads, the rate will be where it was two years ago, and the market for Southern iron will have just that much greater field. With present freights southern iron would find it very difficult to compete in what has heretofore been considered its legitimate field in event prices should go very materially lower. A strong effort is being made for the reduction, with some hope of success.

Charcoal iron is very quiet. The makers seem little inclined to make a reduction in sympathy with coke iron, but in view of the reduced figures being quoted on Lake Superior iron, it seems as though a considerable shading of present quotations would be necessary to secure desirable business. Some makers argue they had rather close down their plants, pocket their gains for the past two or three years, and remain idle, as the scarcity of charcoal and difficulty in securing high grade brown ores in the winter season make the cost too great to warrant reduction in prices now. Quotations were noted the past week at $20, Birmingham basis. This, of course, precludes any hope of successfully competing with Lake Superior charcoal iron in Northern and Western markets.

The different companies of the district are signing up contracts with their coal miners, based on the award of the arbitration commission, which ended its labors ten days ago. Work is going on steadily at the mines, with here and there new mines being opened. The demand for steam coal has slackened a little, and prices are expected to be somewhat lower this month until the domestic coal trade shall have been well begun. Coke is in ample supply for the foundries and furnaces now in operation.

The Birmingham Drop Forge & Machine Co., recently organized, has decided to locate its plant at Bessemer, Ala., adjoining the plant of the United States Cast Iron Pipe & Foundry Co. Practical men are at the head of the venture, and announce

they will be prepared to turn out forgings from the smallest size to five tons weight. The American Bolt Co. has completed its plant at East Birmingham and is now operating at that point. The Birmingham Boiler Works expect soon to occupy their new shop under construction at the same point. Work is going ahead at a good rate on the plant of the Messrs. Schuler at Alabama City, where they are erecting two furnaces and a steel plant. Many smaller industries of various kinds are going up all over the State. Just now considerable attention is being paid to the cement deposits along the Tombigbee River, where the Alabama Portland Cement Co. has for two years so successfully operated. Two other plants are reported as being projected for that section, the deals for lands having been practically closed.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*.
ROOM 1909, NO. 150 NASSAU ST., Sept. 1.

Pig Tin.—Speculative interests have been in evidence in the market during the past week, and prices have suffered a sharp decline. The bears have been encouraged in their campaign by practically a cessation of buying, so very restricted has new business been. The monthly statistics, compiled by Secretary D. Mayer of the Metal Exchange published today, and which have been given a bearish construction, show arrivals for August to have been 3,610 tons, with 1,635 tons afloat; and the total visible supply 16,544 tons, a slight increase over last month. In London, the market has acted in sympathy with that here, and prices are considerably lower. The closing prices at the Metal Exchange today were as follows: Spot, 26.75c to 27c; Septemeer, 26.60c to 26.80c. London's closings today follow: Spot, £123; futures, £121 5s.

Copper.—The market is dull, and there is no good reason for expecting an improvement for at least six weeks to come, inasmuch as wire and brass interests, the chief consumers, are well supplied until at least that time. While the "official" prices of Lake and electrolytic are said to be maintained in the open market, casting is being shaded at least ¼ cent with heavy offerings. The monthly statistics out today show exports for August to have been 10,256 tons, making the total exports for the eight months 82,498 tons, against 117,825 tons for a similar period last year, a decrease of 35,327 tons. In London during the week the market has been irregular, with prices showing a falling off. Closing prices today on the Metal Exchange were as follows: Lake, 13¾c to 13⅞c; electrolytic, 13⅝c to 13¾c; casting, 13⅜c to 13½c. London closed today as follows: Spot, £123; futures, £121 5s.

Lead.—Spot still continues to sell at 4.25c. St. Louis is stronger at 4.20c. London is slightly weaker at £11 2s 6d.

Spelter.—Spot is unchanged at 6.00c. St. Louis is a shade lower at 5.70c. London is unchanged at £21.

Antimony.—Cookson's is 7¼c, Hallet's 6⅞c, and outside brands 6c to 6¼c.

Quicksilver.—Still quoted at $47.50 per flask of 76½ pounds in lots of 100 flasks. London unchanged at £8 2s 6d.

Nickel.—Is selling at 40c to 47c for large lots down to a ton, and 50c and 60c for smaller quantities.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1115 MONADNOCK BLOCK, Sept. 1.

The metal market has been slightly better during the week under review, and orders have been coming in more freely. Consumers, however, are still purchasing in small lots, waiting for a reduction in prices before contracting for their season's requirements. No change in prices is reported, and we quote as follows: Lake copper, carloads, 13½c to 13⅝c; casting, 13¼c to 13⅜c. Pig tin, 29c. Pig lead, 4.20c in 50 to 100-ton lots, and 4¾c to 5c in small quantities; spelter, 5½c in carload lots, and 6c to 6¼c in lesser quantities; sheet zinc, 6¼c; antimony, 10¾c to 11c for Cookson's, and 9¾c for Hallett's. We quote old metals as follows: Copper wire, 11⅛c; heavy copper, 11⅛c; light copper, 10¼c; heavy red brass, 11¼c; light brass, 10¼c; red turnings, 9¼c; yellow turnings, 7¼c.

Production of Corundum and Carborundum.

There was no production of corundum in the United States in 1902 except of the emery variety, and the production of emery was confined to the same localities as for 1901—the mines at Chester, Mass., and Peekskill, N. Y. The total production during 1902 was 3,497 tons, valued at $95,135, a decrease of 808 tons in quantity and of $50,905 in value as compared with the production of 4,305 tons, valued at $146,040, in 1901. The imports of corundum and emery amounted altogether in value to $214,842 in 1902, as compared with the production in 1901, viz.: $294,999, a decrease of over $80,000 in value. The production of carborundum decreased 96,675 pounds, from 3,838,175 pounds in 1901 to 3,741,500 pounds in 1902. The production of crushed steel was 735,000 pounds, that for 1901 having been 690,000 pounds.

Rogers, Brown & Co. say in their market review from Cincinnati: "Some consumers expected that after the so-called schedule had been fixed on basis of $12 for No. 2 foundry at Birmingham, the cutting of prices would go on as heretofore and that by this time the difference between normal and real selling prices would be as great as heretofore. One large consumer went to Birmingham, stating that he would buy a round lot if he could get it on the basis of $11 for No. 2 foundry, and he supposed this could be done. He stated that the lowest offer obtainable was $11.75. Rumors to the effect that anything lower than this had been offered cannot be substantiated. The furnace companies that know what their iron is costing are refusing to make further reductions, and if there is any more sagging in the market it will be gradual. . . . Southern charcoal iron is in light demand and it is anticipated that several stacks will be blown out as soon as the wood and charcoal contracts can be arranged. It is not proposed to accumulate large stocks of charcoal iron in warrant yards to be sold at sacrifice prices as was done several years ago. The determination is generally expressed by furnace owners to blow out and save the money that has been made during the past two years rather than run at a loss and use it up, as has been the custom in previous declines."

During the first six months of the present year Germany exported machine tools aggregating 9,700 tons (of 2,204 pounds) and imported in the same period 1,053 tons, the latter coming principally from the United States. The markets for German-made machine tools are mainly Russia, Austria-Hungary, Italy, Belgium, and France.

Albert Sivyer, aged 19, the second son of Frederick W. Sivyer, president of the Northwestern Malleable Iron Works, of Milwaukee, was drowned at Nantucket, Mass., Saturday, Aug. 22, while sailing with some companions.

A strike of the union sheet metal workers of San Francisco, Cal., for a wage of $5 per day and a Saturday half holiday was called last week. By latest reports nearly every job in the city on which sheet metal workers were employed was tied up. It had been planned at first to make the demand for increased wages from January 1, 1904, but it was decided later to put the demand into immediate effect. The claims of the workmen are resisted by the employers on the ground that they have many uncompleted contracts in hand made on the basis of the old scale of wages.

William A. Perrine, one of the best known molders in New Yirk City, has resigned as business agent of the Iron Molders' Conference Board to take a position with the Cox Stove Co., Philadelphia. He was appointed civil service commissioner shortly after the election of Mayor Low, but resigned some time ago because of the increasing work of the Iron Molders' Board.

THE IRON TRADE REVIEW

Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

PUBLISHED EVERY THURSDAY BY

THE IRON & STEEL PRESS CO.

ROSE BUILDING, CLEVELAND, OHIO.

G. H. GARDNER, President and Treasurer,
JOHN A. PENTON, Vice-President,
A. I. FINDLEY, Secretary.

A. I. FINDLEY, - - - - - - - - EDITOR.
ROBERT I. CLEGG, - - EDITOR MACHINERY DEPARTMENT.
GEORGE SMART, - - - - - ASSOCIATE EDITOR.

CHICAGO: 1115 Monadnock Block, GEO. H. GRIFFITHS, Manager.
PITTSBURG: 429 Park Building, A. O. BACKERT, Manager.
NEW YORK: 150 Nassau St., D. C. WARREN, Manager.
THE CENTRAL WEST: R. A. EVANS, Manager.

Subscription, $3.00 per annum. To Foreign Countries, $4.00.
Advertising Rates Furnished on Application.

The Cleveland News Co. will supply the trade with THE IRON TRADE REVIEW through the regular channels of the American News Co.

ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER.

SEPTEMBER 3, 1903.

THE OUTLOOK FOR IRON AND STEEL EXPORTS.

It is a good commentary on the erratic nature of the American iron and steel trade, which as Mr. Swank said twenty years ago has "either a fever or a severe chill," or, as Mr. Carnegie more recently put it, is "either a prince or a pauper," that before the official statistics have had time to record a cessation in our imports of pig iron and crude steel, it becomes pertinent to inquire what the chances are for our exporting similar products.

Although it is well recognized that the import movement in pig iron and billets is over, yet the Treasury department figures for June last show the imports of pig iron and crude steel for the month to have been the greatest in the half year with the exception of but two months in each case. These were, of course, largely belated shipments on old contracts, the sellers probably having rushed shipment to avoid complications. Meanwhile prices of Alabama iron have declined rapidly and actual stocks in furnace yards in the Birmingham district run very well into six figures. The decline in prices has brought a number of furnaces, both North and South, to the determination that they will blow out as soon as present contracts are completed. To most of those that remain there is left an excellent profit, due to their control of raw materials, and the question at the present moment is whether domestic demand will improve sufficiently, or the blowing out referred to will be enough to produce an equilibrium. Otherwise, exports must follow.

A consideration which might be lost sight of brings the export point nearer than might be supposed. The last export movement in pig iron began in 1897, when the tonnage jumped 200,000 tons, from 62,000 tons in 1896 to 263,000 tons in 1897, the movement being between 200,000 and 300,000 tons a year until it dropped in 1901 to five figures. In the early part of this heavy export movement Birmingham iron had an entry into the Pittsburg district on fairly favorable terms, there being a low open freight rate, and frequent concessions. Today Birmingham iron must pay $4.85 to reach Pittsburg, and to some other points North and Northeast of Pittsburg, formerly considerable consumers of Southern iron, the rate is even disproportionately higher. The result has been that at certain prices f. o. b. Birmingham Southern iron has found a good market in the West, but has been barred from the Pittsburg district. It is also at a disadvantage on the Eastern seaboard, so that the trade there depends largely on special water rates sometimes obtainable.

The geographical differentials promulgated by the Southern furnace association April 1 last met with such a reception that it is hardly likely any such attempt will be repeated. If the furnaces cannot make special prices at furnace to reach certain points in the United States, they are likely to test the possibilities of making special furnace prices for points outside the country rather than make concessions on all trade, when these would also apply to districts in which they have a market without such concessions.

At a market price of $11.50 or $12 at Birmingham it is possible that some Alabama furnaces have reached bed rock, but they are all furnaces which must buy their raw materials. With the best situated furnaces it is even claimed that bed rock would not be reached at $7.50. Some of such furnaces have stocked iron and would not lose money if they exported it at considerably under the present market price.

The possibilities of exportation hang very largely on ocean freights. If these can be made to approach rates which have ruled over long periods in the past, there is nothing impossible in Alabama pig iron being exported in considerable quantities. Prices in England now range from $11 to $12 a ton. Middlesbrough No. 3 is quoted at 46s 9d, or $11.36 and Cleveland basic at 49s 0d, or $11.88, and it is probably a fact that a price an even dollar below this would involve an absolute loss to British furnacemen. The concession which Southern furnacemen would have to make, therefore, in order to export iron, would amount to but very little more than paying the freight.

As remarked at the outset, it is a curious thing that the American iron trade is thus suddenly brought so near to the export point. But pig iron is not the only line in which this condition exists. In wire there are now, and have been for several years, large exports, which have not involved a sacrifice, but a profit. In other lines we are not far off. Galvanized sheets, 24 gauge, are quoted f. o. b. Tees at £11 5s, $54.67 per ton or 2.44c, which is just .55c below prices which are being freely made in the United States at mill. England has an enormous trade in galvanized sheets to all parts of the world, and to many points where the freight from the United States should be less. It is not intimated that this trade can be taken, as of course it is subject to discounts from the open British figures, but the instance is instructive, in that the American sheet trade is under a heavy handicap on account of the high tonnage wages paid.

In plates our regular mill price is only 35 cents a hundred pounds below the price currently quoted at Middlesbrough and Glasgow, and in steel bars there is a difference of only 19 cents in base prices, although extras are much higher here than in England.

All of which indicates that there is a level, much nearer present prices than is generally supposed, at

which surplus products can be disposed of. That the American iron and steel trade is in such condition that this course will be necessary is extremely improbable, but it is profitable at the same time to note that it exists.

DECIDED DECREASE OF PIG IRON IMPORTS.

The report of the Treasury department for July shows that the imports of pig iron for that month this year are in striking contrast with those of July, 1902. Then the imports had begun in earnest, footing up 62,156 tons, whereas the imports for last July were only 38,046 tons. The long expected evidence that the period of importing is ended has at last been supplied. The same is not true of steel, as the imports for July were above those of June, although below those for July, 1902. The imports of iron and steel for the first seven months of 1902 and 1903 were as follows in gross tons:

	1902		1903	
	Pig Iron.	Steel.	Pig Iron.	Steel.
January	7,883	5,312	110,679	38,691
February	8,307	2,235	45,187	20,151
March	17,184	6,570	59,628	31,464
April	19,067	11,986	99,944	29,014
May	30,708	24,380	57,139	26,389
June	32,458	35,588	79,874	30,530
July	62,156	37,150	38,046	33,070
	177,763	123,221	490,497	209,300

Besides the decrease in imports of pig iron in July, 1903, as compared with July, 1902, there were marked decreases in scrap, rails, and other articles, so that the total imports are far below those of last year. The figures in detail are as follows:

IMPORTS OF IRON AND STEEL TO THE UNITED STATES—GROSS TONS.

	July.		7 mos. end'g July 7.	
	1902.	1903.	1902.	1903.
Pig iron	62,156	38,046	177,763	490,497
Scrap	12,704	3,588	48,650	66,475
Bar iron	3,725	3,465	12,391	26,097
Iron and steel rails	7,753	3,086	21,475	75,730
Hoop, band or scroll	289	226	2,756	893
Steel ingots, slabs, billets or bars	37,150	33,070	122,196	209,300
Sheets and plates	262	1,154	3,890	5,636
Tin and terne plates	3,143	5,478	39,669	30,056
Wire rods	2,310	1,626	11,107	12,031
Wire and wire articles	166	611	2,084	2,893
Total	129,658	90,050	410,981	920,208

The total value of iron and steel imports for July, not including ore, but including some manufactures of iron and steel not named in the above table is $3,529,676 against $4,162,183 in July, 1902. For the seven months, the totals are: 1903, $28,849,425; 1902, $19,333,446. For the month, the ore imports were 110,365 tons in 1903 and 101,095 tons in 1902.

The exports for July as compared with the same month last year do not show a large decrease, but for the seven months the exports in tons are far behind those of 1902. For the period, the value of exports, not including ore, but including some manufactures not named in the table, was: for 1903, $57,103,491; 1902, $57,263,304—remarkably near the same amount. The following table gives the exports for the articles named:

EXPORTS OF IRON AND STEEL FROM THE UNITED STATES—GROSS TONS.

	July		7 mos. end'g July	
	1902.	1903.	1902.	1903.
Pig iron	2,926	1,739	19,672	9,196
Scrap	566	273	6,240	2,579
Bar iron	273	209	16,510	12,414
Wire rods	2,638	1,895	9,747	16,238
Steel bars	884	3,034	6,159	12,602
Iron rails	2	93	177	139
Steel rails	5,804	684	54,467	4,758
Billets, ingots and blooms	399	153	1,330	805
Hoop, band and scroll iron	128	51	1,268	1,187
Iron sheets and plates	381	1,138	2,164	2,385
Steel sheets and plates	1,533	501	9,436	7,682
Tin plates, terne plates and taggers' tin	175	2	1,2 0	165
Structural material	2,077	3,185	38,944	19,145
Wire	7,791	8,432	59,681	62,551
Cut nails	559	880	4,559	4,886
Wire nails	2,699	4,434	14,994	18,373
Other nails, including tacks	113	163	1,009	1,295
Total	29,325	26,586	247,554	176 300

MEUM AND TUUM IN JOINT INVENTION.

A good deal of human nature is suggested by a case which has been decided by the Court of Appeals of the District of Columbia. Procrastination is a common failing and there is often the acceptance of a situation not altogether satisfactory but yet profitable. Partnerships of but dimly defined limits become more irksome as the responsibilities increase, and an equitable understanding becomes more difficult with the growing injustice of a false foundation. The ownership of patent rights, where there is doubt as to the actual inventor, is a common instance of such trouble.

Two inventors had given consideration to the dissipation of the exhaust from steam driven automobiles. One had engaged the other to build an automobile and the improvement in question was the cause of frequent discussion. Each finally claimed to be the inventor and according to testimony one had made a determined but unsuccessful effort to have the other sign an agreement. There seemed to be a possibility of finally adjusting the matter by having the patents as they were issued become the property of a company in which both could share an interest. It was agreed that H should apply for patents, the expense to be borne by the company. The financial backer of the firm was familiar with the facts and took an active interest in pushing the application of H.

Unfortunately the plan came to nought and in due course the patent claims of each inventor appeared for scrutiny before the authorities of the patent office and the higher courts. Then the financial friend presents the following explanation: "My recollection is that I was weak enough to permit H. to make an application for a device which I knew was not his invention, thinking that it would come to the Whitney Motor Vehicle Co. in any event under our contract and that H. would feel injured if we did not permit him to make the application." While this application was pending it became necessary to show invention by H. prior to a certain date and both the financial backer and the other inventor made formal affidavits to that end. The irony of the situation is not lessened by the fact that the financial backer who entered into this undertaking was a lawyer.

The court was convinced that there had been no attempt on the part of H. to keep his business associates in ignorance of his inventions and that granting them the benefit of any inference fairly drawn from the evidence there could be nothing more than the raising of a doubt in respect to the question of originality. The opinion of the Commissioner that "all these circumstances raise a strong presumption that H. is the true inventor" was sustained. The plea of expediency and weakness was not sufficient.

The signing of an affidavit, which under the most favorable construction is but half correct, is to be condemned and the error of such a course should be well understood. A wrong position, not easily recognized as such in the early stages, requires only time to develop into an intolerable situation. Agreements cannot well be drawn, it is true, until mutual rights can be recognized, but often that point is quite close to the rocks. The claim that weakness prompted a willingness to compromise does not seem to appeal strongly to the courts.

REVIVAL OF BUSINESS IN GERMANY.

An American Manufacturer Comments on the Situation.

A press dispatch from Berlin dated Aug. 30, says:

"A report issued by the Minister of the Interior, Count Posadowsky-Wehmer, states that there is every indication that Germany is entering upon a new period of prosperity. From all the industrial centers in Silesia, Rhineland and Westphalia come reports of increased business, caused by large orders for machinery. Almost all industrial stock companies have declared larger dividends. The iron works in Rhenish Prussia have received large orders from the United States, as well as from Germany, and have orders on hand to insure work to their fullest capacity for more than a year."

While there is reason to doubt "the large orders from the United States," and while doubtless an over-strong statement is made as to the amount of work ahead in German mills, the general tenor of the dispatch may be accepted as reflecting conditions. After several years of depression it is but natural that the swing in German industries should be toward better things.

In this connection a personal letter to a representative of *The Iron Trade Review* from an American business man traveling in Germany is apropos. The writer says:

"You have frequently heard it said that Germans are satisfied with small profits, but I assure you it is worse than that, for the majority of them are not only willing to dispense with margins, but have been figuring badly and actually losing. Our investigations led us into many channels and with the exceptions of the 'good things' and 'insides' that exist in every country, it is the same all along the line. It was staggering to learn of the big and little concerns in various industries that have not paid a dividend in years. I fear we have always thought them 'wizards,' whereas they are at best desperate mortals that have been deluded with the idea that their method would drive out competition. They are just beginning to wake up now and plans for the betterment of prices and general conditions are freely discussed in hotel lobbies, rathskellers, trains and other public places. As a nation they have made the mistake that keeps many a private concern struggling along. I have profound faith in the Germans and am convinced that as soon as they find the way, which I believe will be soon, they will abolish the ruinous prices. Another thing that points that way is that the traditional cheap labor is becoming restive."

Germany's Preferential Prices to Foreign Buyers.

The German Association for Commercial Treaties publishes a communication to its members in which it inveighs against the policy of the German trusts of selling their products to foreign consumers at slaughter prices, while at the same time they exact high prices from domestic purchasers. The published statement of the association declares that in one of the adjoining foreign states quite a new line of trade has been established. It consists in large consignments of iron tubing and heavy cast iron products received from Germany at points close to the latter's border. These articles are sold at such a large discount below the ruling home rates that they can be resold and reshipped to Germany at a profit, although the German customs duties have to be paid on their entry into Germany. Where German consumers reside not very far from the foreign border they are enabled to import these heavy iron products, pay the return freight and the customs duties on same, and save from $40 to $62 per ton on the price they have to pay by ordering direct from the syndicate (trust) controlling the manufacture and sale of these iron products.

A Philadelphia dispatch says that the Webster Coal & Coke Co. and the Pennsylvania Coal & Coke Co., both controlled by the same interests, have consolidated under the name of the latter corporation. The consolidated capital of the two corporations was $7,000,000, which had been increased to $12,000,000. An issue of $12,000,000 in consolidated and collateral bonds, secured by mortgages on the combined properties, has been made. The new company controls about 80,000 acres of soft coal lands in Cambridge, Blair and Indiana counties on the main line and branches of the Pennsylvania railway. The land is estimated to contain upward of 900,000,000 tons of coal. The capacity of the company's mines are 12,000 tons a day. The company also produces 600,000 tons of coke annually. Contracts have been made whereby the New York Central railroad will extend its lines into the company's property. The officers of the consolidated company are: W. A. Lathrop, president; T. H. Watkins, vice president; Albert G. Edwards, secretary; R. W. Law, treasurer, and Robert Mitchell, general sales agent. The directors are Messrs. Lathrop and Watkins, C. D. Simpson, Horatio G. Lloyd and Richard Williams.

BRITISH VIEWS OF PROTECTION PROPOSALS.

The discussions now found in British trade and daily journals, bearing on Mr. Chamberlain's veiled proposal of a protective tariff, are interesting. The two paragraphs below, taken from English contemporaries, are of particular interest to the iron trade:

Sir John Jones Jenkins, who has just returned from a trip to Norway, is as strong as ever in his opposition to Mr. Chamberlain's fiscal proposals. He says that if working men got increased wages it would mean an increase in the cost of manufactured products, and, consequently, Great Britain would be in a worse position than ever to compete with the other manufacturers of the world. As to retaliatory measures, his belief is that to take any steps in that direction would be only the beginning of a war of tariffs, the consequences of which upon ourselves and upon the British Empire it would be difficult to foresee. He admitted that the tinplate makers had suffered from the McKinley tariff, but he held the opinion that, tariff or no tariff, they could not permanently have retained the American market. Although our trade in Canada had increased from £6,000,000 to £10,000,000 a year, the Americans had practically doubled their trade with the Dominion. It the speech recently delivered by the president of the Quebec branch of the Canadian Manufacturers' Association were studied, there would be found underlying it the idea that when Canada was in a position to manufacture goods largely the Canadians would feel themselves perfectly free to clap a high tariff on any goods from this country which they chose. His (Sir J. J. Jenkins') idea was that as soon as Canada had developed her iron industry she would follow America in that respect. Already the Canadians had done what the United States never did—given bounties to iron manufacturers.

A local journal in the center of one of the principal Lancashire iron manufacturing districts has been collecting the opinions of representatives of the leading industrial firms as to how free trade and protection bears, or would bear, upon their particular industries. The Pearson & Knowles Coal & Iron Co. (Lim.), of Warrington, whilst not committing themselves to any definite statement, are strongly in favor of a searching investigation into the present fiscal position as it affects the general prosperity of the country, and into all matters relating to our foreign trade. Mr. F. Monks, of Monks, Hall & Co. (Lim.), of Warrington, does not believe that the prosperity of the past fifty years is due altogether to free trade. Within the last twenty or twenty-five years there had been increased difficulty in competing with foreign rivals for the export trade of the world, one market and then another being closed against them, either by tariff legislation or by the underselling of their competitors at prices that British manufacturers could not meet. The conditions of our export trade had changed altogether, and the home trade was made unremunerative by the importation of material from abroad at prices admittedly below cost. Mr. William Carson, of the Whitecross Co. (Lim.), of Warrington, believes that an inquiry is necessary, and he deprecates all attempts to forestall public opinion by trades which are untouched by existing fiscal conditions. Mr. W. J. Crossley, of Crossley Brothers (Lim.), believes that to alter our system would be to run a great risk, and one which he is not prepared to face. Instead of strengthening the bonds of Empire he believes that it would undermine and eventually ruin our trade.

The Labor Situation.

SHEET MILL WORKERS REFUSE TO MAKE CHANGES.

(Special Telegram.)

PITTSBURG, Sept. 2.—The special convention of the sheet mill lodges of the Amalgamated Association of Iron, Steel and Tin Workers, which opened here Monday, adjourned last night, after taking a vote against the removal of limit of output. A committee of the independent sheet manufacturers presented their case in the convention yesterday, urging that the limit of output be either increased or removed entirely. The committee consisted of Messrs. Lloyd, of the Curtis Sheet Steel Co., Zanesville, O.; Thomas, of the Niles Iron & Sheet Co., Niles, O.; Langenbach, of the Stark Rolling Mills Co., Canton, O.; Verity, of the American Rolling Mill Co., Middletown, O.; and Campbell, of the Youngstown Iron Sheet & Tube Co., Youngstown, O. While the sheet workers agreed with the manufacturers that by the removal of the limit of output they would be in better position to compete with the non-union mills of the American Sheet Steel Co., they did not believe it wise to adopt any measure which would tend to give employment to a fewer number of men, which they argued would be the case if the limit of output were either increased or removed. The proposition to reduce the number of hours per turn was voted down by the convention and the question of declaring open all of the non-union sheet mills of the country to workers affiliated with the Amalgamated Association was not voted upon. Both these questions are to be taken up again at the next annual convention of the association.

THE MARINE MACHINISTS' STRIKE.

(Special Correspondence.)

NEW YORK, Sept. 1.—The marine machinists' strike has entered upon its fourteenth week. Last Friday there was a conference between the New York Metal Trades Association and the Central Federated Union, which resulted in the latter renewing its demand for a $3 per day minimum, which was again rejected. In speaking of the threatened sympathetic shipyard strike, Henry C. Hunter, secretary of the New York Metal Trades Association, said today to your correspondent:

"There is no reason whatever for believing that any sympathetic strike will take place. Both the blacksmiths and boilermakers, as well as their helpers, have formally put themselves on record against such a course. Without these men a general tie-up at the shipyards could not take place. The shipyards are gradually getting their full complement of men, and I think in about a month or six weeks will be running as smoothly as they have ever been. The labor situation in machine and forge shops could not be more harmonious than it is."

LABOR NOTES.

The September ballot of applicants for membership in the National Metal Trades Association is very satisfactory to Commissioner DuBrul. The association is making splendid progress. The defense fund has increased $25,000 since the first of April, notwithstanding taking care of strikes during the strike season. The membership has increased 40 percent in the past five months and the number of operatives 50 percent in the same period. There are now about 35,000 men working in N. M. T. A. shops.

There has been a noticeable change of attitude in the public press on labor questions in the recent past. There is no longer the extreme timidity shown in holding up to view the unreasonable positions taken by labor unions, and warnings are given that unreasonable demands are unwise and harmful.

The American Anti-Boycott Association, with headquarters in New York, reports good progress in its work and growing membership. The membership will not be made public. That it may become large the initiation fee is put at $25. Charles Biggs, 13 Astor Place, New York, is secretary. A limitation upon assessments has been made as follows: Not more than one-tenth of 1 percent of the payroll of each month, payable on the 10th of the month following, and for not more than six months of any year. The association will use its best endeavors to provide against the boycott of any of its members, the boycott of non-union workingmen or the boycott of the product of members. The expenditure of funds in the prosecution of the boycott will be limited to counsel, court and witness fees and incidental expenses.

The third annual convention of the Blast Furnace Workers' and Smelters' Union of America is in session at Youngstown this week. The eight-hour proposition is the most important matter under consideration, but it is not thought likely that any steps will be taken under present conditions to disturb the existing scale of wages.

The machinists who were on a strike at Beloit, Wis., have returned to work without obtaining any concessions.

At a meeting of the United Housesmiths' and Bridgemen's Union of New York plans were adopted which will enable Sam Parks to continue, from his place of confinement in Sing Sing prison, his work as business agent of the union and particularly the resistance to signing the employers' arbitration agreement. The union voted confidence in Parks and decided to continue his salary of $48 a week regardless of his incarceration for extortion of money from employers.

The statistics of the building department of Chicago's government show how strikes are demoralizing the building industry of that city. Only a little more than one-half the amount of money expended in building enterprises for the first six months of last year has been invested in building work in that city during the first six months of the current year. Nearly $30,000,000 had been spent this time last year in building enterprises for the first half of the year 1902, but only $16,700,000 is shown on the statistical tables as the amount put into construction work on buildings for the same period of 1903.

The presidents of seven national building trades unions held a meeting August 27th at Indianapolis, to take preliminary steps to effect the formation of a national federation of building trades. A call was issued to the larger building trades unions of the country to send three representatives each to a conference to be held in Indianapolis Oct. 8.

The New York Housesmiths' Union, of New York, has been incorporated to operate within a radius of twenty-five miles in that city. This is the territory of the Housesmiths' and Bridgemen's Union, which has been dominated by walking delegate Parks. The new organization is practically non-union.

All the employes in the Bagley & Sewall Co.'s foundry, Watertown, N. Y., thirty molders and seven helpers were discharged a few days ago. The men had made a demand of an increase of 10 percent on day work and a general revision of piece work. The company rejected the demands.

The officers of the International Order of Machinists have been sued for $20,000 damages by the W. P. Davis Machine Co., of Rochester, N. Y., which claims that it has suffered to that extent on account of a strike originated and maintained by the defendant.

Sam Parks, business agent of the Housesmiths' and Bridgemen's Union, of New York City, has been sentenced to not less than two years and a half and not more than three and a half years in the penitentiary, having been convicted of extortion of $200 from a Hoboken contractor. Three other indictments on similar charges are pending against him. Parks is also under conviction for assaulting a rival labor leader, but has not yet been sentenced therefor.

A committee from the machinists' union of Marinette, Wis., called upon the proprietors of the Marinette Iron Works, and stated that the men would not accept the proposition made by the company to bring the strike to a close. The manager of the plant informed the committee that the company would have nothing more to do with the union as such and the plant would likely be shut down permanently. A number of the employes have since returned to work.

The strike of the machinists against the Bates Co., Joliet, Ill., which had been on since May 1, has been settled. The workday has been reduced from 10 hours to 9 hours.

At a meeting of the officials of the structural and building trades unions of the country, to be held at Indianapolis on Oct. 9, an effort will be made to amalgamate all of the national organizations represented at this meeting. President Frank Buchanan, of the International Bridge and Structural Iron Workers' Association, stated this week that an effort would be made to amalgamate all these bodies, and that a platform would be adopted which would put an end to the

building strikes which so successfully tied up building operations the past summer. He believes that a platform along the following lines should be adopted: No demand for increased wages or changed working conditions from the time work on a contract is begun until it is completed. No demand of any kind without 90 days' notice. No endorsement of a strike by an affiliated body unless the same conditions are met by the other body. General co-operation with the contractor. Abolish the frequent strike. Besides the officers of the structural iron men's organization, the coming conference at Indianapolis will be attended by national officers of the United Brotherhood of Carpenters and Joiners, the Bricklayers' and Masons' International Union, the United Association of Plumbers, Gas Fitters, Steam Fitters & Steam Fitters' Helpers, the Brotherhood of Painters, Decorators and Paperhangers and the Building Trade Laborers' International Union.

The strike at the Benwood, W. Va., plant of the National Tube Co., declared by the machinists several months ago, has resulted in the death of two of the strikers. On Saturday night, Aug. 29, two strikers attacked one of the non-union machinists at Bellaire, O., and when the latter boarded a ferryboat for Benwood the strikers followed him and continued their attack. The three struggling men in some manner fell over the rail of the boat, and the strikers were drowned, while the non-union man succeeded in swimming ashore.

The strike of the machinists at the plant of the Westinghouse Machine Co., East Pittsburg, Pa., is now being looked after by A. W. Holmes, second vice-president of the International Association of Machinists. Up to the present time the company has made no overtures to the men to return, and the indications are that the union will not be recognized in any way.

So far as the McKeesport Tin Plate Co., McKeesport, Pa., is concerned, the strike of tin workers is off entirely. The plant is being operated in full without the necessity of employing men affiliated with the Amalgamated Association of Iron, Steel and Tin Workers. On the other hand the association still insists that a strike is in force, and strikers have been causing considerable trouble by annoying the employes of the plant on their way to and from the mill.

A conference of the vice presidents of the Amalgamated Association of Iron, Steel and Tin Workers was held at Cleveland on Friday and Saturday, Aug. 28 and 29, for the purpose of making plain the interpretation of the scale now in force. The following vice presidents were in attendance: W. M. Gibson, Pittsburg; Lewellyn Lewis, Martins Ferry, O.; W. E. Egan, Covington, Ky.; John E. Jones, East Chicago, Ind.; P. J. McArdle, Muncie, Ind.; George Harbin, Youngstown, O.; William Jenkins, Birmingham, Ala.; James Sadler, New Castle, Pa.; John Kersey, Granite City, Ill.; J. B. Mincher, New Haven, Conn.

The strike of laborers at the Malleable Iron Co.'s plant, Trenton, N. J., has been ended, the men having returned to work at the old rate of wages. No concessions were made by the company.

The ten vice presidents of the Amalgamated Steel & Iron Workers met in Cleveland last week to place an interpretation on certain provisions of the new wage scale and agreement of employes and employers. The plan of having a uniform interpretation of all agreements was started last year and proved to be a most gratifying success. Action taken at the session will be referred to President Shaffer for approval.

The strike of the employes of the rolling mills at the Judson Iron Works, Oakland, Cal., has been settled satisfactorily to the men, who will get an increase of wages.

The strike of machinists on the Boston & Albany railroad has been practically ended. Many of the men have returned to work, and others will do so.

Machinists, boiler makers, and carmen have united in a demand for an increased wage scale and a general adjustment of working conditions with a reduction of working hours on the entire Chicago, Milwaukee & St. Paul system. The general rate of advance of the machinists amounts to between 8 and 9 percent. The carmen demand an advance of 20 percent. The boiler makers' scale calls for 36 cents an hour, an increase of between 8 and 9 percent. It is not known how the demand will be received by the railroad company.

The strike at the plant of the Buffalo Union Furnace Co. has been ended by the return of the employes whom the company was willing to take back at its own terms. The company refused to recognize the Buffalo union, which broke its contract, but does not object to a new union, which has been organized by the furnace workers. The old union was composed of members of various classes of workingmen. The plant is now in full operation.

The Chicago, Rock Island & Pacific Railroad is preparing to erect shops on the 38-acre tract recently purchased in South Minneapolis.

PERSONAL.

Thomas H. Gawley, president of the Gawley Foundry & Machine Works, Tacoma, Wash., has completed arrangements for establishing a sawmill upon the island of Okido, one of the most southerly of the Japanese group. Mr. Gawley expects to leave for the Orient in about three weeks.

Floyd K. Smith, Pittsburg sales manager of the Republic Iron & Steel Co., with offices in the Frick Building, has resigned to accept a position with Banning, Cooper & Co., dealers in iron and steel, with offices in the Lewis Building. Mr. Smith will be succeeded by George A. Claypool.

Frank McDonald succeeded Perry Mackey as superintendent of the Bessemer plant of the Republic Iron & Steel Co., Youngstown, O., on Tuesday, Sept. 1. Joe Welsh, who has been assistant to Mr. Mackey, has been appointed assistant to Mr. McDonald.

Mr. and Mrs. Andrew Carnegie will be passengers on the White Star line steamer Celtic, which sails from Liverpool to New York, on Friday, Sept. 4.

Harry Greer, superintendent of construction of the tube mills now being built for the Lorain Steel Co., Lorain, O., has resigned, and will be succeeded by J. C. Dunham, former chief engineer.

Philip W. Jones, superintendent of the Mitchell-Tranter Works of the Republic Iron & Steel Co., at Covington, Ky., was transferred to Toledo on Sept. 1, and will be the superintendent of the Toledo works of the same company. Ralph Smith, shipping clerk at the Mitchell-Tranter Works, will go to Toledo as assistant superintendent. A. W. Selby will succeed Mr. Jones as superintendent of the Covington works.

O. O. Laudig, superintendent of blast furnaces at Joliet, Ill., for the Illinois Steel Co., has resigned to become superintendent of the furnaces of the Sheffield Coal & Iron Co., Sheffield, Ala.

Messrs. Geo. E. Sehmer and Fr. Rottham, of Ehrhardt & Sehmer, the well known steam engine builders of Saarbrücken, Germany, are in this country for the purpose of visiting steel plants and inquiring into American steam engine practice.

John F. Allen, 370-372 Gerard Ave., New York City, reports the following shipments of Allen portable pneumatic riveters for the month of August. This list comprises complete machines only: Oregonia Bridge Co., Oregonia, O.; New Jersey Bridge Co., Manasquan, N. J.; Manning, Maxwell & Moore, New York City; Meehan Boiler & Construction Co., Lowellville, O.; Steel & Wike, Philadelphia; Canton Bridge Co., Canton, O.; American Car & Foundry Co., Berwick, Pa., (2); Builders Iron Foundry, Providence, R. I.; Worden-Allen Co., Milwaukee, Wis.; Chas. Churchill & Co., London, Eng.; Carolina Steel Bridge & Construction Co., Burlington, N. C.; F. B. Tait Mfg. Co., Decatur, Ill.; Locomotive & Machine Co. of Montreal, Canada; East Chicago Bridge & Iron Co., East Chicago, Ind.; Levering & Garrigues Co., New Market, N. J. Total, 16 riveters. The output is up to regular standard, taxing the full capacity. Orders are on hand sufficient to keep the plant going for the next three months. At the same time collections are found to be exceedingly good.

A Swansea, Wales, dispatch of Aug. 29 says that all the South Wales tinplate works controlled by the Employers' Association closed on that day for an indefinite period, in consequence of a wage dispute. Over 20,000 workmen are affected. The dispute is of long standing and is based on the method of payment for certain classes of plates. The lockout affects four-fifths of all the mills. About a dozen non-associated works continue in operation. The locked out men will be supported by the unions.

PYROMETRY BY COLOR COMPARISONS.

A set of patents just allowed to Frederick W. Taylor, of Germantown, Pa., and Henry L Gantt, of Schenectady, N. Y., relates to pyrometers and to means of regulating temperatures. The methods described have peculiar usefulness in the processes of annealing and tempering where the substances undergoing treatment should be heated to a uniform temperature in order that they may all be affected by the treatment in the same degree. The system described is not only useful in the determination of the temperature of an article, but is

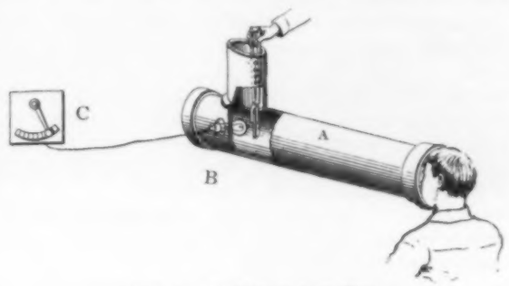


FIG. 1.—SIMPLE PYROMETER.

also adapted for ascertaining whether or not a certain temperature has been reached and for regulating the temperature to the required point. The Taylor-White process, for example, demands some such appliance for the exact heat treatment of the tool steel, and the identity of the one inventor with both improvements being known, it will readily be understood that this method of ascertaining and regulating temperature played an important part in the development of high grade tool steels at the Bethlehem Steel Co.'s plant.

The genesis of the method was not, however, at South Bethlehem, but in Fitchburg, Mass., where Messrs. Taylor and Gantt were with the Simonds Rolling Machine Co. Mr. Taylor here devised a machine for heating bicycle balls for hardening. The balls were put in at one end and came out in a stream at the other; thence they dropped into the bath of water or oil. The falling balls passed through a dark chamber and on one side of this space was the observer's tube and on the other side was an illuminated screen. The screen had a color representing the proper temperature for hardening the balls. If the balls were of the proper temperature, they would practically disappear in crossing the illuminated screen opposite the tube of the observer. When the balls were too hot they would be seen as bright streaks, and if too cold they would show as dark streaks. The adoption of this pyrometer

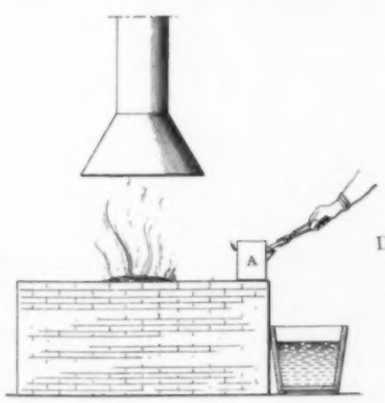


FIG. 2.—PYROMETER FOR FORGE.

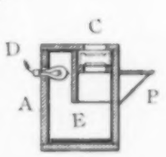


FIG. 3.—SECTIONAL VIEW OF PYROMETER.

reduced the number of balls improperly hardened from somewhere in the neighborhood of 10 percent to less than 1 percent.

The invention now patented covers the comparison of color and intensity of light given off by one body having an ascertained relation to temperature, with the light emitted from another heated substance. The standardized medium may be a carbon filament heated by the electric current as is the common incandescent lamp, or it may be the light transmitted through colored glass or a colored solution contained between transparent walls. The system depends upon the fact that when metals and other substances are heated above certain limits they emit colored light which changes as the temperature increases or decreases, the color and intensity of the light varying with an exact relation to the temperature. Steel, for instance, at a specified temperature gives off a light of a certain color and quality and it is possible to ascertain with accuracy when steel has reached that point by observing it in comparison with a standardized colored light. It is obvious that if various colored lights can be employed for comparison as standards and if means are provided for bringing them successively before the eye of the operator the temperature of the steel can be determined by comparison with the standard light to which its appearance corresponds.

The apparatus to meet these requirements may be considerably varied in form and a selection has therefore been made in the pyrometers submitted in this article. A pyrometer box is shown in Fig. 1. The tube is at A and there is an opening at the side through which is located the incandescent electric lamp B. A rheostat C allows the current transmitted through the filament of the lamp to be varied at will, with a consequent variation in the color and intensity of the light given by the lamp. This furnishes a convenient way of determining the temperature of a heated object by varying the quality of the light from the filament until it coincided with the object under examination. The relation of the electric current to the temperature has of course been determined previously. An opening in the top of the tube permits a heated tool or any similar object to be held by tongs alongside the lamp during the test as illustrated.

Fig. 2 is an elevation showing a simple form of pyrometer in connection with a forge, and Fig. 3 is a sectional and en-

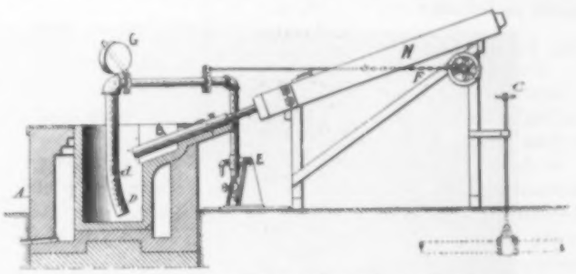


FIG. 4.—LEAD POT WITH TAYLOR-GANTT PYROMETER.

larged view of the pyrometer used with the forge. A is the pyrometer box with a tool shelf B at one side. The colored medium is placed at C and an opening through the box enables the workman to compare the heated tool on the shelf with the light passing through the standard medium at C. A bottle filled with colored fluid is shown as the medium at C. The inventors found in practice that the best results were obtained by using an aqueous solution of methyl orange (though other analine orange solutions answer reasonably well) as the translucent fluid. The colors are further modified by dissolving in the solution varying percentages of nergosene, which is useful in regulating the glow or intensity of the colored light.

The character of the light is further modified by the character of the reflecting screens used in the pyrometer box, as at E in Fig. 3. The inventors tone the light from the lamp at D by lining the chamber A with some non-reflecting material, such as black velvet for the lower temperatures or white porcelain for the higher ones.

Fig. 4 shows a side elevation, partly in section, of a lead bath provided with means for heating and cooling its contents and with a pyrometer of the Taylor-Gantt type. The furnace chamber A has at the bottom a platform supporting the lead pot and having a flue leading from the furnace round the lead pot to a stack. B is a closed end tube projecting into the melted lead and resting on an extension of the lead pot. C is the hand wheel of the valve controlling the air blast to the furnace. A water conduit is shown by D and d, the latter being the inlet pipe and the end of D is closed. The water passes through d and returns by the outer pipe D to an outlet near the point E, where the conduit system is pivoted. A rod chain and hand wheel is used in combination with the weight

G to regulate the position of the water pipes in the lead bath.

The pyrometer tube H telescopes into the open end of the pipe B and has a sight aperture at the front end. At the rear end are partitions with incandescent electric lights and reflecting screens of varying character. Rheostats are connected with the lights in order to vary the intensity of the glow.

The pot being full of melted lead, in which the end of the tube B is immersed, a colored glow is visible through the tube according to the degree of temperature. Two light chambers may be used, the glow from one being a little higher and the other corresponding to a slightly lower temperature to the one desired in the tube B. The operator using the two light chambers as a species of limit gauge can nicely appreciate the approach of the heated tube to the required temperature.

The regulation of the bath temperature is controlled by the hand wheel C, by which the draft of the furnace is regulated, and the cooling tube D, which is manipulated by the chain and hand wheel F, plunging the cooling tube into the bath or withdrawing it as desired. By one or both of these means the temperature is rapidly regulated to standard and a tool then immersed in the bath will be heated to the required point.

The manufacturing rights under these patents have been acquired by the Thermo-Gage Co., of Trumansburg, N. Y.

THE SCHWARTZ FURNACE IN MALLEABLE WORK.

Some account was given in our issue of June 18 of the malleable cast iron test heat made in a No. 3 60-inch Schwartz furnace at the works of the Hawley Down Draft Furnace Co., Chicago. The test was made in the presence of persons representing malleable iron and steel casting interests. Dr. Richard Moldenke, whose analysis of mixture was used, has made a report as follows:

New York, June 20, 1903.

The Hawley Down Draft Furnace Co.,
Chicago, Ill.

Gentlemen.—I beg to hand you herewith report on the test for malleable casting purposes, made in the Schwartz furnace at your works on June 12, 1903.

A charge of 1,000 pounds, consisting of 600 pounds No. 2 charcoal pig iron, selected because of its low silicon; 325 pounds Stewart pig iron (coke), and 75 pounds steel scrap, was placed in the furnace and the blast turned on. The analysis of the materials is as follows:

	Charcoal Iron.	Stewart Iron.	Steel Scrap.
Silicon	.89	1.05	.05
Manganese	.60	.17	.42
Phosphorus	.283	.045	.06
Sulphur	.018	.022	.035
Total Carbon	3.95	4.05	.09

The composition of the charge would be as follows:

Silicon	.86
Manganese	.45
Phosphorus	.189
Sulphur	.021
Total Carbon	3.69

This composition approximates the bulk of the mixtures used in this country for malleable casting work.

As I desired to note whether the Schwartz furnace could be handled as a melter only (a very important point in malleable practice) the air pressure was kept comparatively low during the first half of the test, or 1½ pounds. When it was noted that the process could be kept simply a melting one when desired, the pressure of the blast was raised during the third quarter to 2 pounds, and finally in the fourth quarter the blast was 2½ pounds and the furnace was tilted so that the blast was allowed to impinge directly upon the melted metal, thus refining it considerably. This action was well illustrated in the test plugs taken off during the operation. The first three cast, while simple melting and heating was going on, were quite gray, the metal cast at the completion of the operation being white and of the proper composition.

The first test plug was poured 40 minutes after charging, the next 20 minutes thereafter, the third 17 minutes after this, and the heat poured 18 minutes later. The total time consumed was 1 hour and 34 minutes, and 940 pounds of metal was taken out, showing a melting loss of 6 percent, which is very good for such small quantities. Analysis made of the castings poured from this heat showed the following results:

Silicon	.51
Phosphorus	.188
Sulphur	.034
Manganese	.15

Physical tests were also made of two test bars made from this heat and showed the following results:

Test Bar No. 1.....32,640 pounds tensile strength
Test Bar No. 2.....34,488 pounds tensile strength

I may add that had the refining been allowed to take place earlier in the operation, the time of melt would undoubtedly have been brought within one hour. It is, however, a better policy to melt without refining until the skimming off of the slag. A higher blast pressure might be used at the very outset, and this would hasten the process considerably without undue oxidation.

From the remarkable flexibility of the process, a reducing, neutral or oxidizing flame being produced at will, the action of the blast being indirect or direct upon the metal as wished, I would hold that a method of this kind would be very desirable where comparatively small amounts of metal are to be handled.

RICHARD MOLDENKE.

A 12-inch bar was tested for deflection and the following results were found:

Under load of	500	lbs.	.....	Deflection	.02 inch
" "	1,000	"	.....	"	.03 "
" "	1,500	"	.....	"	.045 "
" "	2,000	"	.....	"	.065 "
" "	2,450	"	.....	"	.08 "

This latter figure seemed to be the elastic limit. The bar broke between 3,550 and 3,600 pounds (transverse breaking strength).

A Patent That Was Not Granted.

The Commissioner of Patents recently rejected an application for a design patent. It would seem from a reading of the decision that the application had reference to an ornamental cross strap for a pair of suspenders. The attorney describes the improvement in part as follows:

"This decorative design is carried out by an ornate double-line scheme of embellishment which harmonizes with the general configuration of the cross-strap. To heighten the whole artistic effect in the compound-curved narrow oppositely-projecting elliptical adornment of the central design, the inner continuous compound endless line is made broader and more distinct than the outer line."

The trouble must have been that the English language was not equal to the burden the inventor imposed upon it.

The new Bessemer plant of the Lackawanna Steel Co., Buffalo, is completed. It is now expected that steel rails will be rolled in October. At a recent meeting of the board of directors it was decided to turn out the first steel rails the first week in October. A director says: "We may not turn out more than 100,000 tons of steel rails during October, November and December, as these three months will be largely taken up with getting the new plant in thorough working order. With the new year we expect to start at our maximum capacity, and during 1904 hope to turn out not less than 1,200,000 tons of finished products. We are in the market now for orders and are keeping in touch with conditions. So far as we are able to view the outlook in the iron and steel trade, the future prospect is good. Our orders for future delivery are heavy, and there is no cancellation of contracts on the part of our customers."

The annual report of Guest, Keen & Nettlefolds, Ltd., the British iron consolidation, shows that the company has added to its surplus account about £130,000 after preferred dividends of 5 percent and ordinary dividends of 10 percent and after carrying to reserve account £150,000. The net profits in 1903 were £410,181, against £447,204 in 1902 and £505,259 in 1901, when the companies were independent.

The meeting of the board of directors of the Colorado Fuel & Iron Co., scheduled for this week in New York for the purpose of organization, has been postponed on account of absence of directors from the city.

Lewis Foundry & Machine Co.

While the iron and steel industry in the Pittsburg district was still in its infancy, John L. Lewis, now president of the Lewis Foundry & Machine Co., established a small jobbing foundry on the South Side, Pittsburg, and the demand for castings and rolls for rolling mills soon induced him to enter the field as a builder of rolling mill equipment. The growth of the foundry kept pace with the growth of the iron industry,

FIG. 1.—THE LEWIS FOUNDRY & MACHINE CO.'S WORKS.

and the output of the foundry and machine shop was increased from time to time. Three years ago it was decided to expand the plant further, but owing to the high price at which property was held adjoining the works, it was found that additions must come to a halt, except at a great cost, and it was decided to remove the plant from Pittsburg, to a site where plenty of room would be provided not only for present but future needs as well. A location was secured 12 miles from Pittsburg, on the Pittsburg & Lake Erie Railroad and the Ohio River, at a station called Groveton. The site upon which the new plant is located consists of 15 acres and plenty of room is provided for expansion. Work on the buildings was commenced promptly, and in the summer of 1901 the foundry was placed in operation. The machine shop was first operated six months later. The South Side plant was then abandoned but the office at the old location is still utilized as the city office of the company.

The latest methods and the most improved machinery were adopted for the plant throughout, with the result that the present plant is one of the most modern for the production of iron and steel works equipment in the country. Electricity and compressed air are used entirely in the operation of the machinery, the heavy tools in the machine shop being operated by individual motors. Plenty of cranes have been provided for the handling of the material and the receipt of raw material and the shipment of the finished product is greatly facilitated by four tracks which lead to various portions of the plant.

The foundry and machine shop, separate buildings, are each of the same size, 200 feet long, with the main spans 60 feet wide and two lean-tos each 29 feet wide. Between the two buildings are located the blacksmith shop, engine house and store room, and tracks lead from the foundry to the machine shop, the material being carried from the one department to the other on trucks. The pig iron and scrap yard is commanded by a 25-ton electric crane, having a 30-foot span. A runway 300 feet in length parallels the foundry. A siding the entire length of the craneway is used for the receipt of raw material.

The foundry is commanded by one 60-ton electric traveling crane with two 30-ton hoists and one 15-ton auxiliary running the entire length of the building on a 59-foot span, and one 35-ton electric crane. A railroad siding runs into the foundry, thus facilitating the loading of cars with heavy castings. The iron is melted in two cupolas, one of 10 tons and the other of 14 tons capacity; and two air furnaces with a capacity of 20 tons each are provided. The fans for furnishing the blast to the cupolas are motor driven. The roll casting pit is 35 feet long, 10 feet wide and of a variable depth. It is steel lined throughout, thus keeping out all moisture, a precaution quite essential on account of the high water sometimes encountered. The cores are dried in two ovens, the one 12x20 feet and the other 23x20 feet. The core making department and the cleaning room are also located in the main foundry building. An electric elevator, running between the two cupolas carries the charges to the charging floor, and in the event of an accident to the elevator the charges can be delivered by means of the yard crane.

FIG. 2.—MACHINE SHOP.

The machine shop is commanded by a 25-ton electric crane with a 59-foot span, running the entire length of the building, and a 15-ton electric crane commands the roll turning shop. The machine shop is amply provided with both heavy and light

tools for machining all the castings turned out, while the roll turning shop is equipped to turn any rolls from the smallest up to 60 inches in diameter.

The blacksmith shop is located between the foundry and machine shop and is 40x40 feet and is equipped with four fires and one hammer. The storeroom is likewise located between the foundry and machine shop and is 40x25 feet. The engine room is 40x50 feet and contains two Westinghouse gas engines of 125 h. p. each, direct connected to two General Electric Co.'s direct current generators of 100 killowatts each, and an air compressor for the operation of the pneumatic chippers and drills in use in the plant. Railroad sidings run into the machine shop and between the foundry and machine shop. The pattern-making shop and pattern storage department are located in a building 200x60 feet.

FIG. 3.—ROLL TURNING SHOP.

FIG. 4.—ANOTHER VIEW IN MACHINE SHOP.

The output of the plant consists of all kinds of iron and steel works equipment as well as general castings. The products cast and built consist of sand and chill rolls, tin, sheet, merchant, bar, guide, universal billet, skelp, structural, rod, hoop and cotton tie mills; vertical, lever, guillotine, squaring, plate, doubling, clipping, scarfing, slab, splitting, tin plate squaring, rotary, revolving and side cutting shears to be driven by belt, engine, electric or hydraulic power; roll lathes, belt or electric driven, for turning the smallest to rolls 60 inches in diameter; vertical and horizontal punches, bending and straightening machines, angle straightening machines, hydraulic presses, ore, clay and sand mills; hot and cold saws of all description; corrugating machinery, curbing machines for corrugated sheets, plate bending rolls, squeezers, feed tables, sand mills, sand dryers, engines and the following hydraulic machines: ingot extractors, presses, shears, accumulators, lifts and cranes.

The company is very conservatively capitalized and has the following officers: J. L. Lewis, president; E. K. Lewis, vice

president; W. A. Harris, secretary and chief engineer; L. H Davies, treasurer, and J. W. Davies, assistant treasurer.

The Miller Anchor Co., Norwalk, O., capital stock $20,000, recently organized, will manufacture the Miller anchor for telephone, telegraph, electric line, and in fact, poles of all kinds. It will not build a new plant, as it has a building.

FIG. 5.—ERECTING SHOP.

The building occupied by the Hornellsville Foundry at Hornellsville, N. Y., was destroyed by fire a few weeks ago. The destruction was a severe blow to the proprietor, John A. Adsit, who decided to rebuild. His employes, to show him their sympathy and to render assistance, offered to work for one week free of charge in rebuilding the plant. The offer was accepted.

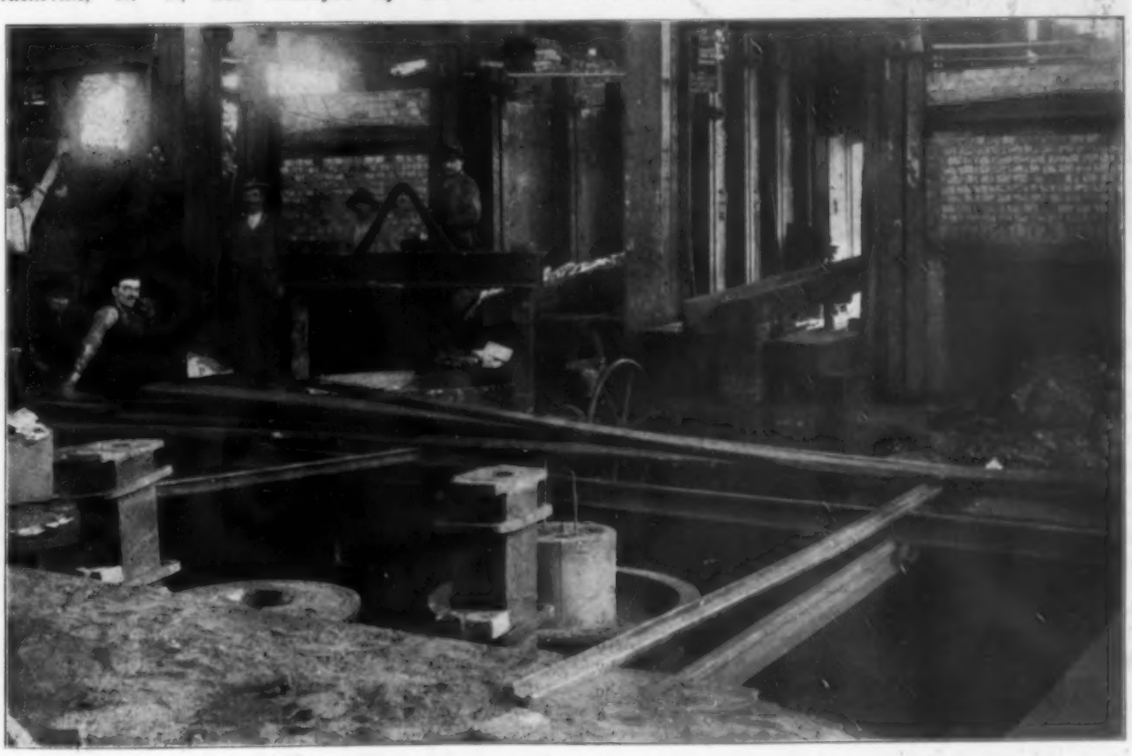


FIG. 6.—AIR FURNACES AND ROLL CASTING PIT.

THE GREAT WABASH CANTILEVER BRIDGE.

The great cantilever bridge of the Wabash Railroad over the Monongahela River at Pittsburg, in process of construction, to be finished in November, will be one of the largest of its kind in the country. Its truss span of 812 feet, with double tracks, is the largest in America. To steel men there is further interest in the use of the largest eye-bars in the world, for the making of which a new plant had to be built. With reference to the latter, as they compose the main structural strength of the bridge, they are subjected to tests at the American Bridge Co. as to their chemical composition and their construction, that have resulted in some being rejected and destroyed. The specifications for these bars show the care expended upon their design:

"Eye-bars shall be rolled from ingots having at least 25 percent of the top cut off and exhibit no piping. Bars must be rolled down in one heat from the bloom, which must be of sufficient thickness to insure the proper amount of work in rolling and proper finishing temperature. Specimens must be taken from the center and sides of the bars and tested, annealed and unannealed; the cold unannealed bending tests to be made on pieces the full thickness of the bar. The heads of eye-bars and enlarged ends of rods shall be made by upsetting or forging into shape, by such process as will insure uniformity of product and be satisfactory to the engineer. Eye-bars, forgings or members of important parts, reheated, must be carefully annealed with pure heat, free from destructive gases, before being machined. The annealing of full-sized bars must be done with great care and with a pure flame, heating the bar throughout its full length uniformly, and to a temperature at which the steel shall become non-magnetic and not over 75 degrees above that temperature. It shall be held at this temperature only as long as it is necessary to acquire a uniform heat, and it shall be allowed to cool in the furnace to 570 Fahrenheit for a time not exceeding 24 hours or less than 12 hours. Eye-bars that can be tested within the limits of the largest machines must show at least 12 per cent enlongation in 20 feet and a yield point of not less than 30,000 pounds per square inch, with a breaking strength of 58,000 pounds. The number of bars to be tested must be representative of the size of the bars to be used and will be determined by the engineer. The contractor will pay for all the bars failing to meet the requirements of this specification. Bars tested to destruction and fulfilling specification's requirements will be paid for at the cost of material and manufacture, less credit for the scrap value of the material."

Chicago's passenger fleet will receive an important addition as the result of a contract signed last week by the Northern Michigan line and the American Shipbuilding Co. The new boat is to cost $285,000, and will be ready for service at the opening of the passenger season next year. It will have a speed of 18 miles and a capacity of about 2,500 people. She will be 275 feet long, 40 feet beam and 18 feet deep. Work on the steamer will be started at once at the South Chicago yard.

The Structural Steel Car Co. of Canton, O., which recently went into the hands of a receiver, has filed a statement of its condition, which shows liabilities aggregating $70,500, with assets of $207,062.

NEW INDUSTRIES AT INDIANA HARBOR, IND.

There have been some important industrial developments recently at Indiana Harbor, Ind. The Standard Forgings Co., organized three months ago at Chicago with a capital of $250,000, has purchased 12 acres at Indiana Harbor, and will build a plant of which the principal structures will be two forge buildings each 80x500 feet; the power house 59x62 feet; the boiler house, 50x52 feet; the machine shop, 50x135 feet, and the office building, 35x35 feet. It is expected that the buildings will be ready for the installation of machinery the latter part of this week. Some machinery has been purchased and other contracts are pending.

The American Steel Foundries recently purchased 30 acres of land in Indiana Harbor, in an admirable locality as to railroad facilities. About $175,000 will be expended, beginning at an early date, but it is proposed that the entire investment will be about $500,000. The plant will have a capacity of 100 tons of finished castings a day and will employ about 500 men. The building in which will be the molding floor and core ovens will be 62x500 feet with a lean-to 70x270 feet. One 20-ton acid, and one 20-ton basic open-hearth furnace will be erected in a building 60x250 feet. The machine shop, power house and pattern shop will be in one two-story building, 60x150 feet. All buildings will be of steel and brick construction. The new plant will replace the one now operated at 59th and Wallace Sts., Chicago, known as the Sargent plant.

FIG. 7.—METAL YARD AND RUNWAY.

Dravo, Doyle & Co., Pittsburg representatives of the Ball Engine Co., Erie, Pa., have recently received an order from the National Tube Works, Pennsylvania Department, for a 700-h. p. horizontal cross compound Corliss engine, direct connected to an alternator.

The Norristown Iron Co., Norristown, Pa., has sold its rolling mill property to H. H. Light and S. P. Light, of Lebanon, Pa., for $30,000. There is little left but the walls of the rolling and pipe mills, as the machinery has long since been removed. The buildings will be razed.

M. Nelson Cecil has been appointed receiver for the Heating, Ventilating & Foundry Co., Wheeling, W. Va. The receiver is authorized to carry on the business of the company, and borrow money not exceeding $75,000 and pay off all employes.

Experience with the Premium and Piece-Work Systems.

BY R. J. SUTTON.

The attitude of the International Association of Machinists and other labor organizations in this country against the inauguration of the premium and piece-work systems is well known. The radical stand taken by this organization at its convention in Milwaukee a few months ago for the elimination of these systems after a fixed date was rather unexpected by manufacturers generally, in view of the association's previous unsuccessful experience in trying to prevent the introduction of the premium system. It, however, clearly proves that their future policy will be as formerly, that is, to vigorously oppose any system which holds out an incentive for the mechanic to work according to his individual ability, and they will meet such systems with organized resistance. The question naturally arises, why is organized labor opposed to a system that will advance wages? The answer from the labor agitator's standpoint is simply this: because it will increase production, and thereby decrease the total number of men employed. This is one of the strong arguments used at private union meetings. Another is that the piece-work prices or premium limits will soon be reduced, and this naturally appeals to the individual machinist, though, if officials of labor organizations were sincere in this, they could recommend to the members of their craft to ask the company to clearly define the system, especially regarding the permanency of the piece-work prices or premium limits, and I have no doubt most manufacturers would be willing to draw up a fair and mutually satisfactory agreement with their employes.

FIG. 1.—PREMIUM ORDER FORM AND STUB.

The Manufacturers' Proposal.

The following was submitted over three years ago by a manufacturer in Cincinnati as a basis of a premium system. It is certainly very broad and so liberal that the president of the International Association of Machinists asked to have a copy of same, in order that he could present it at the International Association of Machinists' convention in Buffalo, which was then only a few weeks off:

1. That each employe shall be guaranteed his regular day's work wages.
2. That the time limits shall never be lower than the average time made with the same tools under the day's work plan.
3. That no one shall be discharged because of failure to reduce his time below the limits.
4. That in addition to his regular wages each employe shall be paid one-half of his hourly rate, for each and every hour he may reduce his time below the prescribed limits.
5. That the limit once fixed shall not be lowered except through the introduction of new methods of doing the work.
6. That all premiums shall be paid within two weeks of completion of the work upon which they are earned.
7. That at the end of one year's time the plan will be withdrawn from all those not wishing to continue under it.
8. That, if withdrawn, the employe shall not be required to work at the same rate of speed without an equivalent in wages.

In presenting the above, however, President O'Connell very liberally added the following clause:

9. Any member of the International Association of Machinists working at the premium work system shall not be permitted to earn more than 10 percent in excess of the average wage paid in that locality. Shop committee shall ascertain each day the amount earned by each member under the premium work system. All over 10 percent he may earn shall be forfeited to the lodge of which he is a member, and report same to the financial secretary of the lodge.

The premium system was then treated as piece-work and rejected. The ninth condition is, of course, impracticable, and would naturally greatly restrict production.

Piece-work, though, still has many friends; but I am of the opinion that the majority of them are either prejudiced or do not understand the premium system. Right here some one will say that I am myself prejudiced, and this I want to deny by saying that I entered the employ of a large Eastern manufacturing concern about nine years ago. It performed all of its productive labor under the piece-work system. Two years later I changed one system in which approximately 900 hands were employed, from piece-work to a premium basis. The system proved highly successful in every way, and increased the total production in this section about 100 percent over the previous piece-work system. It was also much more satisfactory to employes, and has gradually superseded piece-work in all machining departments. I had general supervision of this work up to the time I left the company, and therefore had an excellent opportunity to judge the merits of the two systems.

Much Depends on the System.

Most manufacturers give the very important question of systems for the remuneration of their employes very little attention. They all know what they pay per week, hour's work, but to what extent their production is being restricted, few indeed know. It all depends on the factory system, and the one who questions the detail operation costs. When an employer simply enters an order for a given number of complete machines, and the workmen are only required to charge their time to the order on a daily time slip, and no comparative record is kept of operation costs on detail parts, and the workmen not questioned in regard to the excessive time spent on individual

operations, it is safe to say that the production of such a plant is from 20 to 80 percent under the maximum which could be secured under the premium system. The majority of manufacturers only allow piece-workers to earn a certain percentage over their given day rates, and when this is exceeded the piece-work prices are cut. It is therefore obvious that it is detrimental to the machinists' trade, or any other craft, to increase their earnings over the percentage allowed. Other manufacturers, instead of doing this, guarantee that the piece-work price will be maintained for a period of six months, and others for a year. This, though, is equally as bad, and in such cases the workmen warn all new employes not to "kill the job," and they

COST DEPARTMENT

WORK DONE BY

NAME _____ NO. _____

MILWAUKEE, _____ 190

ORDER NO.	OPERATION AND NAME OF PIECE	JOB NUMBER	PIECES FINISHED	HOURS DAY WORK	HOURS PREMIUM WORK	AMOUNT
	TOTAL,					

NOTE.-Order Number, Operation, Name of Piece, Job Number, Pieces Finished and Hours must Correspond with Premium Job.

APPROVED _____ FOREMAN.

THE IRON TRADE REVIEW

FIG. 2.—DAILY TIME SLIP.

accordingly only earn what in their judgment the company will stand without cutting the piece-work prices.

Competition in most lines of manufacture is such that costs must be reduced, and as it is impossible to do this under the piece-work system unless prices are cut, it is their only method to reduce costs. But when a piece-work price is once cut simply because the workmen's earnings were too high, the incentive to increase production is ruined, while the workmen continue, using a shop term, "to nurse" their jobs.

Why Employes Prefer the Premium System.

One of the principal reasons why the premium system is much more acceptable to union and non-union workmen than piece-work is because the employer can afford to be much more liberal with it than is possible under the piece-work system, on account of the co-operative feature in sharing with the employe the time saved. After the premium limits have been established and given to the workmen, they should not be reduced unless advantageous changes have been made in the design of apparatus, or improved machinery purchased, and even then the change in the limit should be based on the original time, and the reduction made in proportion to the improvement.

Suppose the time limit on a given operation is ten hours,

PREMIUM REPORT.

DEPARTMENT FROM TO

JOB NUMBER	OPERATION	NAME OF PIECE	TYPE OR SIZE	TIME LIMIT	TIME TAKEN	TIME SAVED	DAY RATE	RATE EARNED	PREMIUM EARNED

THE IRON TRADE REVIEW

FIG. 3.—WEEKLY PREMIUM REPORT.

and the workmen completes it in five, and that his day rate is 30 cents per hour. It is obvious that this operation costs the company $2.25, while formerly it cost $3.00. This is an increase in production of 100 percent, and the cost is reduced 25 percent, while the workman earns 45 cents per hour, as the employe receives one-half of his given hourly rate for the time saved.

This same case, piece-work, would work out as follows: $3.00 would be the piece-work price, as piece-work prices like premium limits are based on the average time taken under the day work system. The operation would always cost $3.00, regardless of the time consumed on the job, and the workmen would earn 60 cents per hour instead of 45, as under the premium system. But workmen rarely earn anything like this figure while working piece-work. In view of the above comparison, one would at first thought think workmen would prefer piece-work, but this is not true, as has been thoroughly proven by public remarks and articles by labor leaders. Piece-work is despised by all crafts, and I think their stand is justifiable in most cases, on account of the continuous cutting of piece-work prices. I have known piece-work prices to be so low that competent machinists would only earn half of their given day rate per hour. This and other unfair conditions in connection with the piece-work system has caused a great many strikes, while the premium system is rapidly gaining favor, especially in Europe, where it has recently been adopted by the Amalgamated Association of Engineers, which is similar to the International Association of Machinists in this country, although they fought the introduction of the piece-work system for years through many very serious and costly strikes.

Forms Must Fit Conditions.

Most manufacturers are of the opinion that the premium system is complicated, but the fundamental difference between it and the piece-work system is that under the former a fixed number of hours are given, which is known as the premium limit, while under the latter a piece-work price is given for the completion of a certain operation or job. For the benefit of the many who contemplate inaugurating the premium system, I give the accompanying forms, which I devised for a Western manufacturing concern. Remember they are successful for this company's product, and have increased it over 150 per-

TIME LIMIT

OPERATION

TYPE OR SIZE NAME OF PIECE

DETAIL OPERATION COSTS

JOB NUMBER	PIECES FINISHED	TOTAL LIMIT	TIME TAKEN	TIME SAVED	DAY RATE	RATE EARNED	PREMIUM EARNED	TOTAL COST	COST EACH
TOTALS									

THE IRON TRADE REVIEW

FIG. 4.—CARD INDEX.

cent. Yet they might be useless for your particular line, as all forms should be made to suit the company's product. I would suggest that the system be clearly defined to employes, and if it is on a liberal basis the increased production and reduction of manufacturing costs will be beyond all expectations. These forms are few in number and of simple character, especially when the fact is considered that many manufacturers use from 10 to 25 complicated forms in connection with the piece-work and premium systems alone. The following, though, have proven quite sufficient, even though the product involves operations more complicated than are usually found in machinery manufacturing companies.

Fig. 1 is a premium operation job sheet, and is filled out by the foreman or his clerk from a permanent record of operation time limits on each detailed machine part. This form is 6x11½ inches. Fig. 2 is a daily time sheet, made out by all workmen on an hourly basis, and represents the complete distribution of his day's work. The total hours are checked with the time clock or check board readings, and the hours charged to Fig. 1 are checked with Fig. 2, upon completion of Fig. 1. The printed notes on these forms are self-explanatory. The Premium Report is made out at the end of each pay period for the different departments from Fig. 1. This report is shown in Fig. 3, and is 8½x14 inches in size.

Fig. 4 is a card, 4x6 inches. This serves several purposes. In the first place, it is a permanent record of the premium limits and operations. Secondly, it forms a comparative record of detailed operation costs. The data on Fig. 1 is posted to this card upon completion. The card is also an excellent check as to the correctness of the time limits, and the calculation of the premium job as per right-hand corner of Fig. 1, and the

person in charge can readily investigate any discrepancy that might occur. These cards are, of course, filed under the name of the detail parts of various machines by the card index system. The columns on the face of the card in Fig. 4 are continued on the back. Figs. 3 and 4 are not absolutely necessary, but I believe are well worth the small expense of keeping them up. One clerk can, after the system is inaugurated, keep the premium records, make up pay rolls, distribution of same to the various factory orders, pay the men, and keep the costs for 250 employes. So it is evident that the system is not complicated.

The success or failure of the premium system depends entirely upon how it is presented to the workmen, and the defined policy of the company inaugurating it. If the workmen's confidence can be secured, failure will be impossible. I will illustrate this by saying that the system caused a strike in the second company in which I installed it over two years ago. One of the leaders of the strike, who was a toolmaker, secured a position with another company, and afterwards returned to work at his old place. Premium work is not applicable to our tool work, and this same man asked his foreman if he could not be transferred to the machining department at 26 cents per hour, day rate, instead of 30 cents, which he had received in the toolroom, in order that he could earn premiums. His foreman could not spare him at the time, but he continued asking to be transferred, and finally was, about six weeks ago, and he is now earning double his day rate of 26 cents per hour; but he is now turning out three times as much work as we formerly secured on the day rate basis, two-thirds of which the company receives at 50 percent of his day rate.

The total time limits for all the departments for the week ending May 2, 1903, was 15,971¼ hours; time taken, 5,776; time saved, 10,215, for which workmen received one-half of their day rate, which amounted to $991.29. The original limits were considered fair by factory foremen of wide experience.

A Case in Point.

A very large company in the East has on many important and costly machine jobs increased production over 500 percent. A large lathe job for a certain number of pieces, which sell at $1,500, required 800 hours to complete under the day-work system, and foremen believed that this time could not be materially reduced under any system, and employes declared they could not earn premiums. However, the best time now taken under the premium system is less than 100 hours, and the average time is 125 hours. Yes, few indeed realize the productive power of improved machinery and tool steel of today, and when the premium system is more generally adopted on a fair and equitable basis, it will increase production, decrease manufacturing costs, and the increased earnings of employes will be so great that manufacturers will not be so particular about the number of hours worked per day, and a great stride in the solution of the labor problem will have taken place.

The figures given in tables A and B are from actual practice and clearly exhibit the relative saving of the premium plan over piece-work.

COMPARATIVE COST AND HOURS TAKEN TO PERFORM SAME WORK UNDER DAY WORK AND PREMIUM SYSTEMS.

TABLE A.

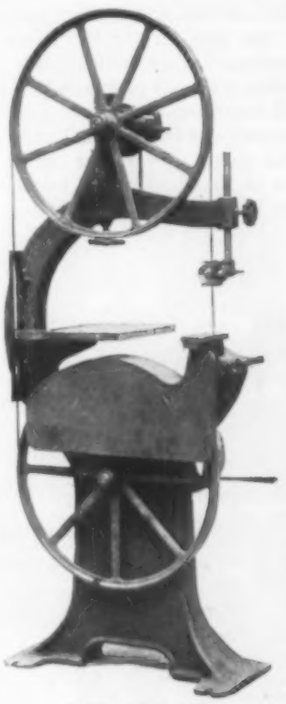
CLASS OF WORK.	No. of Pieces.	DAY WORK.		PREMIUM.	
		Hours on Job.	Cost.	Hours on Job.	Cost.
Planer	200	200¾	50.43	100	39.75
Bench	300	375	75.00	231	60.60
Lathe	2400	3,000	936.00	1213¾	625.14
Boring Mill	2500	3,125	812.50	788	507.21
Lathe	250	2,000	530.00	427¼	264.42
Horiz. Mill	1200	2,400	624.00	777⅝	335.11
Bench	50	375	97.50	132	65.78
Bench	813	3,465¼	416.13	1123	271.25
Total		15,542	$3541.56	4792¼	$2159.36

TABLE B.

CLASS OF WORK.	No. of Pieces.	PIECE WORK.		PREMIUM.	
		Hours on Job.	Cost.	Hours on Job.	Cost.
Lathe	18	75	$27 75	39	$13 00
Planer	20	98	36 50	41	17 38
Boring Mill	20	74	28 73	28	12 75
Bench	50	176	52 80	102	41 70
Lathe	35	297	54 40	128	42 50
Planer	10	50	15 00	20	10 50
Bench	35	180	63 00	75	42 62
Lathe	85	102	25 50	48	18 75
Total		1052	$303 68	475	$201 20

SPRUE CUTTER FOR BRASS CASTINGS.

This machine has been designed for use in brass foundries, for sawing the sprues from castings. The common shear sprue cutter leaves a short stub end that has to be ground or filed off and this work takes time and is as well a waste of material. The band saw saves time and material as the saw will shave the sprues and fins close to the castings. The machine shown is different from the ordinary band saw as the regular table is replaced by a special rest which will permit the irregular shapes of the castings to be passed to the saw more readily than could be done on a flat table. It will also be seen that this special rest forms a shield to prevent the chips from coming between the saw blade and the lower wheel. Of course a special grade of blade is employed for use on the machine in



HAND SPRUE SAW.

sprue cutting. The machine is made by the Crescent Machine Co., of Leetonia, O.

The Stickel Machine Co., Williamsport, Pa., which holds the patent on an anti-friction journal bearing, has concluded not to erect a plant at this time, notwithstanding it has had some fine propositions. It has decided to select a central shipping point, open up an assembly room and solicit bids from manufacturers for the different parts. The company reached this decision so that it might be as expeditious as possible in filling orders already received. The drawings and patterns will soon be completed, when bids will be received.

Lee & Porter, Dowagiac, Mich., manufacturers of axles, inform us that the report published in Michigan newspapers that they had joined the consolidation of axle manufacturers is not true. They are now busy on some large orders for automobile front and rear axles. They are anticipating a very large business the coming year in all kinds of axles, including ball bearing axles, automobile axles and bicycle gears.

L. J. Hammond has been appointed receiver of the General Automobile & Mfg. Co., Cleveland, on petition of the W. M. Patterson Supply Co., which holds a claim for $1,063 for supplies. The petition states that there are other claims against the concern amounting to $50,000, which the company has been unable to meet.

The Memphis plant of the Southern Car & Foundry Co. will resume operations under the receivers appointed by the Federal Court of New Jersey.

THE HAMILTON ENGINE LATHE.

Extensive improvements have been made in the entire line of Hamilton lathes. The new machines are designated as style "A". They are heavily built and powerfully geared, enabling them to do work of the heaviest character rapidly and at the same time are so arranged as to be well adapted to smaller work.

An important feature is the patented universal screw-cutting and feeding arrangement, an improved system of mounted change gearing, giving a full range of screw pitches or feeds without removing a gear, enabling the operator to change from one thread or feed to another almost instantly. The style "A" lathes are all of the same general design, a typical illustration being that of the 26-inch lathe seen in Fig. 1.

The bed is wide and deep, well webbed, unusually heavy and has large V's. The pads for the lead screw, feed rod and reversing rod bearings are grooved and the bearings planed to fit them, assuring true and permanent alignment. The 20, 22, 24, 26 and 28-inch lathes are mounted on cabinets, which afford a firm support and provide cupboards for the storage of tools and small parts. These sizes can be furnished with the ordinary form of leg. Lathes with long beds are provided with one or more intermediate legs.

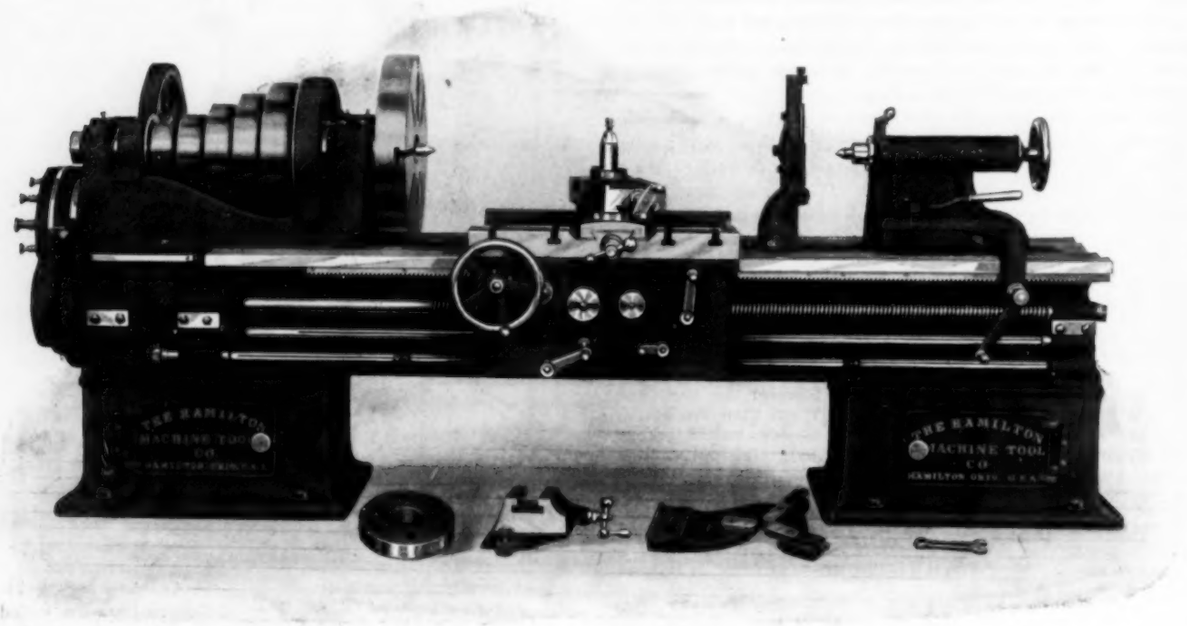


FIG. 1.—THE HAMILTON ENGINE LATHE.

The headstock is massive, has a five step cone pulley and is strongly back geared. An improved locking device is fitted to the cone spur gear of the 14, 16, 18 and 20-inch lathes, by means of which the cone pulley may be instantly locked or unlocked without the use of a wrench, permitting the back gears to be quickly thrown in or out.

The hollow spindle is made of a crucible steel forging of high carbon; it has a large hole bored through its entire length and is accurately ground. The spindle boxes are made of the best quality phosphor bronze and are carefully scraped to a bearing by hand. Anti-friction thrust bearings are provided, with nut for adjusting. On the 14, 16, 18 and 20-inch lathes the thrust washers are of steel, hardened and ground, while the 22, 24, 26 and 28-inch lathes are provided with ball thrust bearings, which reduce the friction to a minimum. The centers are of tool steel, and should have their points hardened and ground before being used. They are sent out soft in order that the user may finish their points to any desired angle, as the nature of his work may require. Gear guards, which can be readily removed if necessary, are placed over all exposed gears; they not only prevent injury to the workman, but protect the gears from chips and dirt.

The tailstock has a curved front, allowing the compound rest to be used at right angles to the cross slide. The tail spindle is graduated in inches, for convenience in drilling. The carriage is large, securely gibbed front, center and back, and is scraped to a solid bearing on the bed throughout its entire length. It is entirely flat on top and amply provided with T-slots, so that work can be easily clamped upon it. Power longitudinal and power cross feeds are provided and the cross feed screw has micrometer adjustment. When cross feed is in use, the carriage can be quickly clamped to the bed by means of a screw. All sizes of style "A" lathes are now provided with a rotating indicator, or chasing dial, located on top of the carriage; this enables the operator to catch the thread quickly and properly without backing the lathe, permitting him to return the carriage quickly by hand.

The compound rest is large, and has long and broad wearing surfaces. All sizes except 14-inch are fitted with taper gibs which require only one screw for adjustment. The 16-inch lathe has taper gibs on the lower slide only, the larger sizes on both upper and lower slides. The handle of the compound rest is removable and can be taken off when not in use, so as not to interfere with the cross feed handle. The compound rest swivel is graduated in degrees, so that it may be adjusted at any desired angle. The tool post is turned from solid steel and fitted with a tool steel screw. The collar and bottom plate of tool post are also made of steel and case hardened.

The apron is tongued and grooved into the carriage, and all parts are strong and of good size. The mechanism is so arranged that it is impossible for both lead screw and feed rod to be engaged at the same time, thus preventing breakages from this source. Both the longitudinal and cross feeds can be instantly engaged or disengaged simply by turning the knurled nuts shown at the front of the apron, except on the 14-inch lathe, in which the cross feed is operated by shifting the small knob near the top of the apron. All feeds are reversible from the apron, by means of the lever near the bottom of the apron toward the left.

The automatic stop can be used in thread cutting as well as in turning. It operates equally well in either direction. It enables the operator to chase up to a shoulder, can be used to advantage in internal chasing or boring, or can be set so as to prevent the carriage from running into the face-plate or tailstock, should the operator forget to throw out the feed. The stop collars can be quickly set at any desired point so that the carriage can be stopped instantly from either direction. This feature is of great advantage, especially on duplicate work, as it prevents the necessity of measuring each part separately.

The lead screw is used only for screw-cutting, the turning feed being driven from a separate rod, and is therefore not liable to excessive wear. It is cut from a master screw and is

not splined, so that it is very accurate; the lead screw nut is of the usual split pattern, lined with the best quality babbitt metal and operated by a cam in such an manner as to secure a firm and even grip.

The double friction countershaft is fitted with large friction pulleys running on self-oiling bushes, and can be oiled without throwing off the belts. The cone pulley is of larger diameter than the one on the spindle, insuring ample driving power, and is flanged at the lower step to prevent the belt from slipping off. By placing pulleys of different diameters on the line shaft and using two straight belts on the countershaft, twenty different spindle speeds are obtainable; this is double the ordinary range and is especially desirable when using the new high speed tool steels. As each lathe is provided with a chasing dial to facilitate the rapid cutting of threads, there are but few cases where a backing belt is required.

All shafts and studs, the lead screw, feed rod and all rack and pinions are of high grade steel; all gearing is accurately cut from the solid; bronze nuts are used on the cross feed and compound rest screws. Spindles, spindle bushings, and important shafts are finished by grinding, and all sliding surfaces are carefully scraped to a bearing. Each machine is inspected and thoroughly tested under the belt before being shipped.

The new universal screw-cutting and feeding arrangement, or change gear mechanism, is seen more clearly in Figs. 2 and 3. This arrangement affords a means of easily and quickly producing any desired thread or feed within the wide range provided. It provides a range of 48 different screw pitches or feeds, any one of which can be obtained in a few seconds' time. It also furnishes a positive all-gear feed, enabling the operator to use larger and heavier cuts and to quickly obtain the correct feed for all classes of work. It is not an "attachment," and forms an integral part of the lathe, just as much so as the headstock, carriage, apron, or any other part.

Briefly described, the device consists of two casings or boxes, in which is mounted the gearing necessary to produce the requisite number of changes. Fig. 3 plainly illustrates the construction, the different parts being designated as follows: 1, spindle; 2, spindle gear; 3, (four) compounding gears; 5, sliding shaft or "center pin" (tool steel); 6, (three) central driving gears; 7, (eight) mounted clutch change gears; 8, (eight) change gear shafts or "knobs"; 9, circular gear box; 10, gear box locking pin; 11, connecting clutch gear; 12, (three) intermediate gears (mounted); 13, intermediate gear stud; 14, lower gear casing; 15, (three) lead screw change gears (removable); 16, handle for gear casing cover; 17, reversing mechanism; 18, lead screw; 19, feed rod; 20, reversing and automatic stop rod.

As will be seen, the spindle gear 2 transmits the motion through the compounding gears 3 (of which only two are engaged at the same time), through the center pin 5, to the driving gears 6; these drive the lower clutch change gear 7 and connecting clutch gear 11, which transmit the motion through the intermediate gear 12 to the lead screw gear 15. The circular gear box 9 may be rotated so as to bring any of the eight mounted clutch change gears 7 in mesh with the intermediate gear 12. The reversing mechanism 17 is controlled from the front of the lathe apron. The mounted clutch change gears 7 are each entirely independent of the other, and are arranged so that only the one in use can be engaged. No adjustments are necessary, consequently no time is wasted in changing from one thread or feed to another. To transmit the motion from the spindle to the lead screw, nine gears are employed. All the gears are covered and protected, the side of the lower casing being removable, so as to afford convenient access to the lead screw.

The general design of the arrangement is the same for all sizes, and the 26-inch lathe from which the accompanying illustrations are taken, explains the method of operation. The copy of the 26-inch lathe index plate shown is plain and simple, so as to be easily understood. The words "In" and "Out" in the column under "Center Pin" refer to the position of the sliding shaft 5, in the center of the circular gear box. Under "Screw" is given the required lead screw change gear; three of these gears are provided, and they can be instantly slipped on or off as required. The "Box Numbers" are stamped on the circumference of the circular gear box and designate the different mounted clutch change gears 7; the box should be rotated until the "Box Number" called for is opposite the pointer, when it is instantly secured in position by a spring locking pin; this brings the required "Box" gear into mesh with the connecting clutch gear 11, to which it is connected by simply pushing in the handle or knob 8 with which each "Box" gear is provided; the knob on the gear in mesh is always at the lowest point of the circular gear box, and the arrangement is such that it is impossible to push in the wrong knob, thus preventing any error from this source.

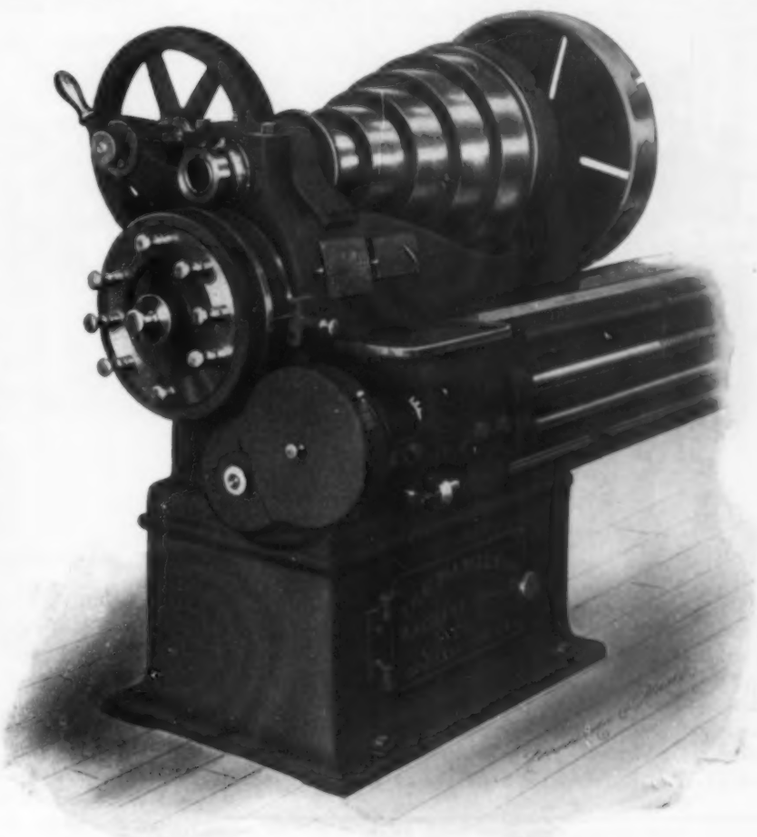


FIG. 2.—THE HAMILTON UNIVERSAL SCREW-CUTTING AND FEEDING DEVICE.

Referring to the index for the 26-inch lathe, it will be noted that with the 80-tooth gear on lead screw, 16 different threads from 8 to 28 per inch may be chased without removing a single gear, the changes being made while the lathe is in motion, by simply rotating the circular box and setting center pin as called for in index. By placing the 50-tooth slip gear on the lead screw, 16 additional threads from 2 to 7 can be obtained, and by using the 20-tooth slip gear, still another 16 threads from ½ to 1¾ are obtained, affording a total range of 48 different screw pitches or feeds.

On the 20-inch lathe, the ratio between feeds per inch and threads per inch is 8 to 1, and on the other sizes in proportion. To secure any desired feed it is only necessary to reduce it to the corresponding thread, by dividing by the ratio as given in the index, and set up the machine accordingly; for instance, if it is desired to feed 20 per inch, divide 20 by 8, equals 2½; in the index, 2½ is found under "Box Number" 3, with center

pin "In" and 50-tooth gear on lead screw, showing at once how to obtain the required feed.

This line of lathes is made by the Hamilton Machine Tool Co. of Hamilton, O.

Wm. B. Scaife & Sons Co., of Pittsburg, manufactuers of Scaife and We-fu-go water softening and purifying systems, will be represented in the future in Philadelphia by Duncan W. Patterson, M. E., with offices in the Harrison

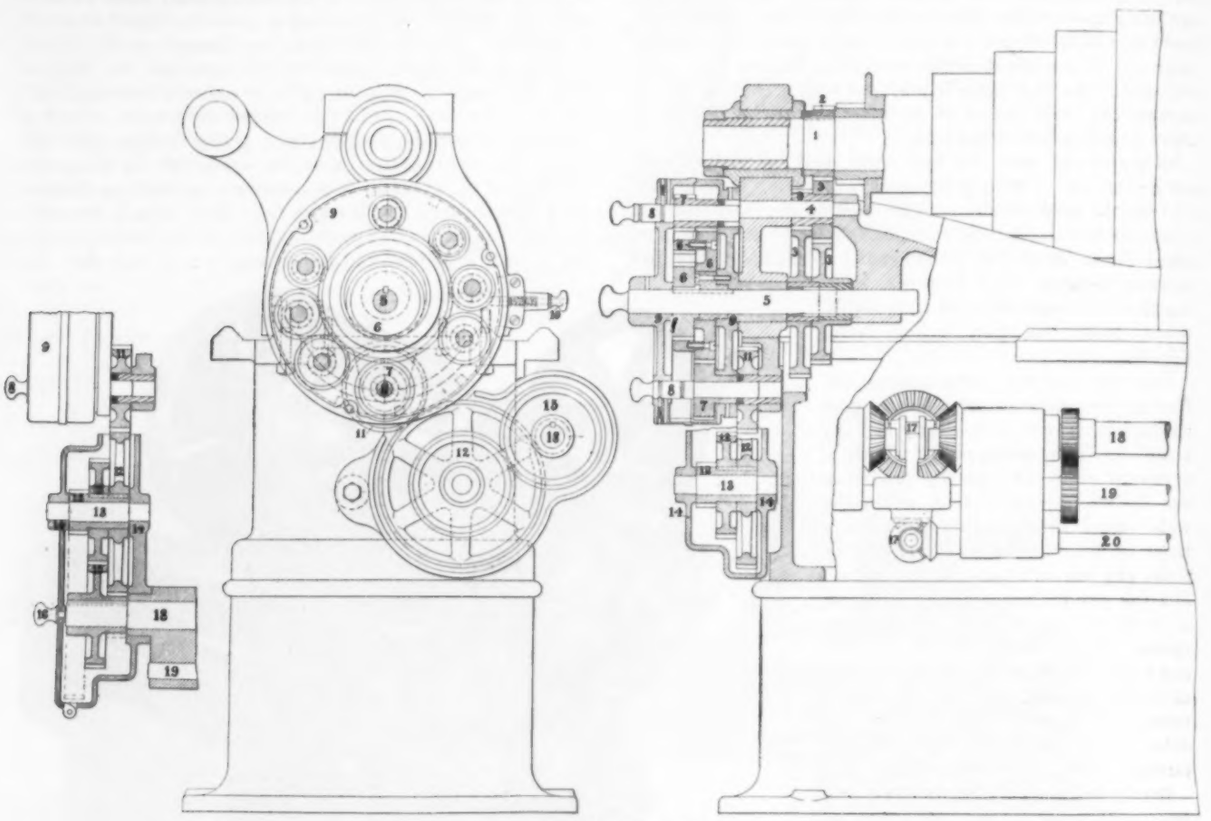


FIG. 3.—DETAILS OF SCREW-CUTTING AND FEEDING DEVICE.

building, corner 15th and Market Sts., in place of Mr. Fierstine, whose offices were in the Bourse building. Mr. Patterson has been handling the "Bachman" system of water purification, a continuous system treating hot feed water under pressure, for the past two years, and has made a number of installations at some of the large iron works and furnaces. He will have charge of all of the work of Wm. B. Scaife & Sons Co. in Eastern Pennsyl-

THE HAMILTON MACHINE TOOL CO.
HAMILTON, OHIO, U. S. A.

Center Pin	Screw	BOX NUMBERS.							
		1	2	3	4	5	6	7	8
		THREADS PER INCH.							
In	20	½	⅞	1⅛	1¼	1⅜	1½	1⅝	1¾
Out	20	1	1⅛	1¼	1⅜	1½	1⅝	1¾	1⅞
In	50	2	2¼	2½	2¾	3	3¼	3½	3¾
Out	50	4	4½	5	5½	5¾	6	6½	7
In	80	8	9	10	11	11½	12	13	14
Out	80	16	18	20	22	23	24	26	28

FEEDS—8 TIMES THREADS.

FIG. 4.—INDEX PLATE.

vania, Southern New Jersey, Delaware, Maryland and Virginia, in the water purifying department.

Furnace No. 2 of the Columbus Iron & Steel Co., Columbus, O., which has been out of blast for 30 days for repairs, is being relined and will probably resume operations about Oct. 1.

BOND PLAN HAS FAILED.

It is announced that the plan to furnish the Consolidated Lake Superior Co. with $12,000,000 of new working capital by an appeal to the stockholders to subscribe to an issue of 4 percent bonds at 60, had been abandoned. The plan has proved a failure, only $3,000,000, or one-fourth of the contemplated loan, having been taken by the stockholders. One of the directors said:

"The stockholders have disappointed us in not coming forward with the money we need, as we expected they would. This makes it necessary to draw up an entirely new plan. I do not know how the money will be raised, but you may rest assured that in one way or another we will get it. A magnificent property like that, in which $30,000,000 have already been invested, will not be allowed to go to wreck. The properties have enormous earning power. In May the company earned $140,000 and in June $160,000. That was without our steel rail mill running, which cost us $5,000,000. The company will have no difficulty in meeting whatever charges it may assume in order to get its properties running."

The company has outstanding $27,400,000 preferred stock and $82,000,000 common. It has no bonded debt, but at the beginning of the current year it borrowed $5,200,000 of Speyer & Co., as security for which it pledged the stocks of all the subsidiary companies, thus virtually mortgaging all their physical property. This loan matured July 1. The interest was paid up to that date and the maturity of the principal was indefinitely extended.

The consolidation of the Ramapo Iron Works, of Hillburn, N. Y., and the MacPherson Switch & Frog Co., of Niagara Falls, heretofore announced, has been authorized by the secretary of state of New York. The principal plant will be in Ramapo, N. Y. The capital is $1,400,000, and the directors are: W. M. Snow, F. W. Snow, and R. J. Davidson, of Hillburn; W. B. Rankine, of Niagara Falls, and J. M. Van Winkle, of Bloomfield.

The Flickinger Wheel Co., Galion, O., informs us that there is no truth in the statement published in newspapers that its plant has been purchased by the Woolsey Wheel Co., of Sandusky, O.

NEW 14-INCH ENGINE LATHE.

A 14-inch engine lathe of new design is manufactured by the Pratt & Whitney Co., of Hartford, Conn., and has the double purpose of providing the degrees of convenience and accuracy ordinarily associated with bench precision lathes and at the same time to excel in working capacity the usual lathe of the same nominal dimensions. The construction is therefore much heavier and the net weight of the machine with 6-foot bed and taper attachment is 2,200 pounds, a weight which compares with that of most 16-inch lathes. Ample metal is thus provided to secure great rigidity under heavy cuts. Views of the lathe are shown in Figs. 1 and 2.

The bed is of box section of exceptional depth and width to provide the greatest resistance to bending and torsional strains. The head and tailstock are fitted to the bed with a V at the rear and a flat track at the front, a construction which permits the cross bridge of the carriage to be made heavy and rigid. The head is strong and is held by heavy bolts screwed directly into the bed of the lathe. The spindle boxes are of best babbitt metal cast solid in the head and are bored and scraped to exact alignment. The gears are covered by cast iron guards. The tailstock is offset so that the compound rest may be set parallel and has long bearing on the ways with setover for taper work.

The spindle is large with ample bearing surface, accurately ground, and has a 1.3-inch hole through it. The overhang of the nose-piece beyond the front bearing is exceptionally small, thus ensuring unusual stiffness in the spindle. The end of the spindle is cylindrical, with a heavy threaded collar close to the front bearing, providing a rigid support for chucks and face plates.

The apron, Fig. 3, is made double with shafts of large diameter supported in bearings at both ends. The carriage is gibbed at both front and rear, has broad bearings upon the V and the flat track of the bed and is regularly furnished with compound rests. On cross-feed work the carriage may be clamped to the bed. The power cross-feed is driven by friction worm gearing, as is also the longitudinal feed. These worms are hardened and run in oil.

In turning, the carriage is fed by a splined shaft driven by belt on a two-grade cone which through gearing, regulated by a lever at the head end, gives six changes of feed for each spindle speed. Roughing and finishing feeds are obtained without stopping the machine. The feed belt is wide, runs over large and quick running cones, and is provided with a tightener. Automatic longitudinal feed stops are provided. Slide screws are protected from chips and have micrometer dials.

The taper bar is graduated on one end in degrees and on the other end in thirty-seconds of an inch and provided with adjusting screws. It is within easy reach of the operator from front of machine. One bolt clamps it to the slide when in use. There is but one working joint and this is provided with gib so that all lost motion can be taken up.

The relieving attachment, Fig. 4, which is furnished to order with this lathe, is connected directly to the taper attachment and carriage as in Fig. 2, and there is no lost motion or uncertainty as to the movement of the cutting tool. As regularly constructed it is adapted to relieving hobs, straight and taper cutters and taps. It is entirely out of the operator's way, and at no time interferes with the use of the compound rest. It is quickly thrown out of use without detaching from the lathe. The relieving attachment has single, double, triple and quadruple rise cams, with a cam for taps, together with eight extra change gears, giving nineteen changes for relieving, ranging from two to thirty-two for each revolution of the lathe spindle.

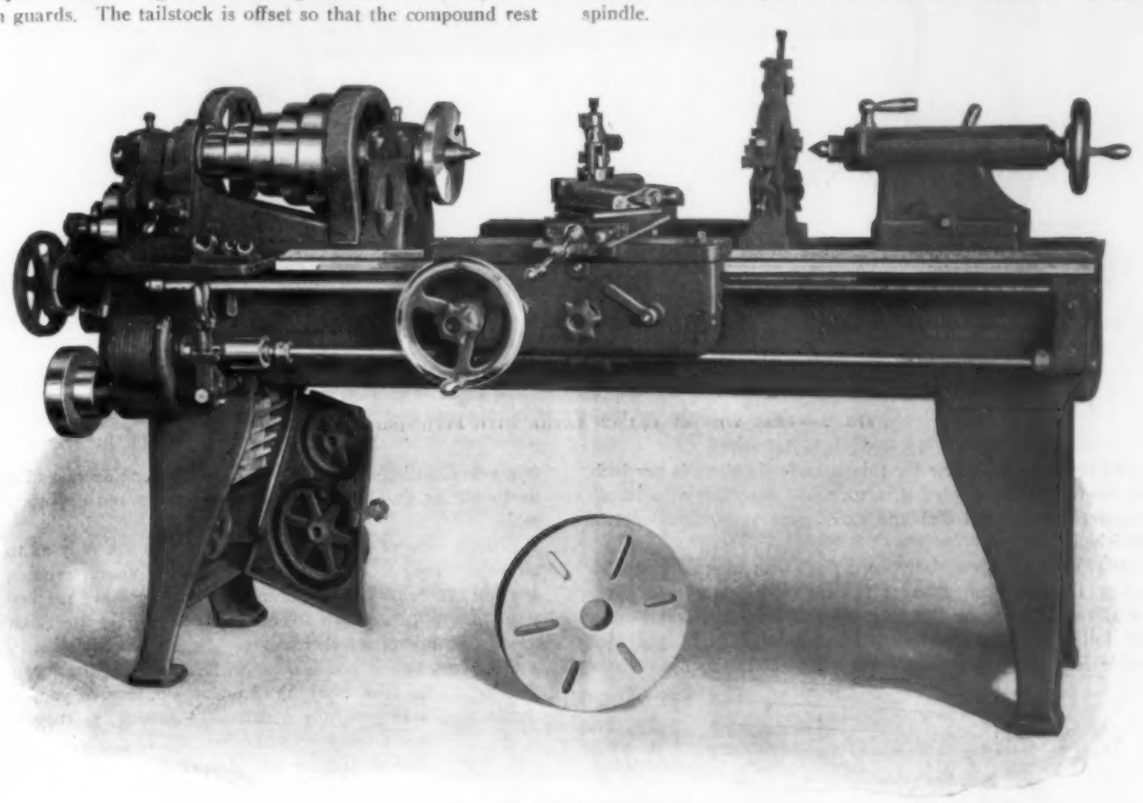


FIG. 1.—NEW 14-INCH LATHE.

For backing off the teeth of spiral cutters the regular relieving attachment has an additional shaft and sleeve, the latter carrying a stud which slides in a groove milled in the shaft to conform to the spiral it is proposed to relieve. The shaft is sent out blank, that the user may cut such grooves as he may require. A milling cutter for cutting these grooves accompanies the sleeve and shaft. By removing this special sleeve and shaft the device becomes the regular relieving attachment for straight and taper work.

For turning work from ¾ to 2 inches in diameter which must be carried on arbors, arbors with expanding bushings may be furnished. These arbors, Fig. 5, carry the work on six points in the surface of a cylinder concentric with the spindle axis, and consequently work turned on them will run dead true on a straight spindle, which cannot be assured when work is turned on a tapering arbor. They are carried in the spindle in place of the center bushing and are tapered at their outer end for expanding bushings. A collar turned on the arbor serves as a convenient stop against which work may be set when turning up to exact thickness with the carriage clamped to the bed. When necessary, these arbors may be held in place by the draw-in spindle, they being threaded at the rear end for that pur-

pose, but in ordinary work this will seldom be reduced.

The relatively small diameter of the screw which holds the bushing in place makes it possible to counterbore or chamfer the end of a hole without using a hook tool. The minimum diameter of each bushing is its nominal diameter, 1 inch, 1½ inches, etc. The maximum adjustment for each size is .004 inch. Bushings are marked with minimum and maximum diameter permissible. Both arbors and bushings are hardened all over and ground.

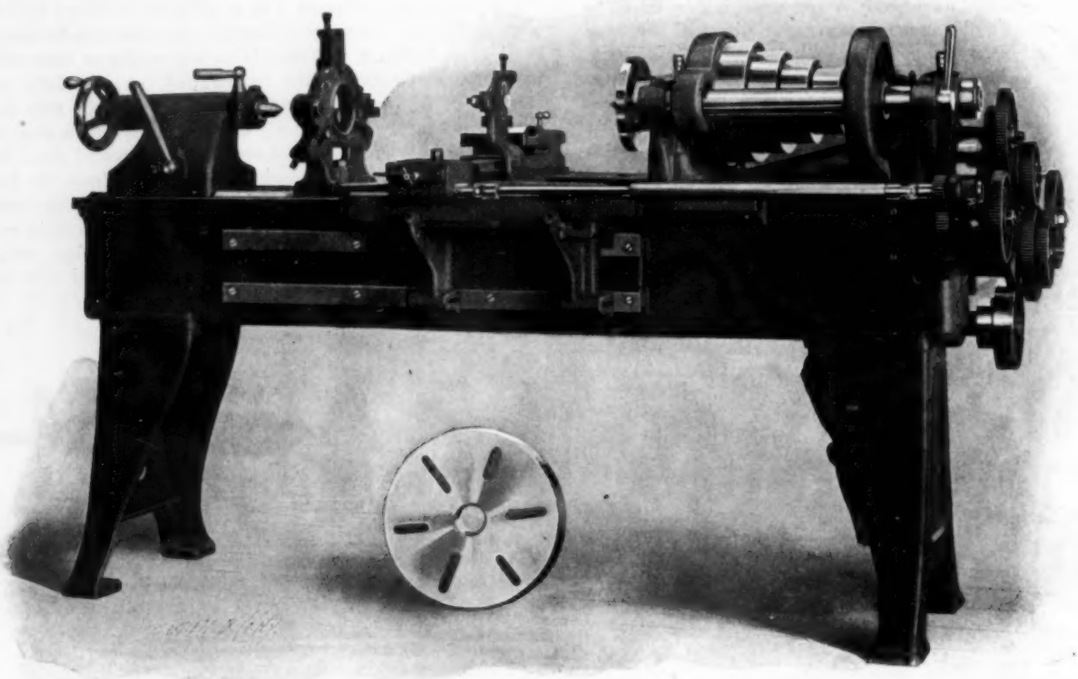


FIG. 2.—REAR VIEW OF 14-INCH LATHE WITH RELIEVING ATTACHMENT.

The regular lead screw for this lathe is six threads per inch, but metric lead screw of 4 m/m pitch, together with metric cross-feed screw and dial and extra gear of 85 teeth, can be furnished.

This machine is regularly furnished with change gears for cutting threads from 2 to 92 per inch, including 11½, compound rest, two centers, large and small face-plates, stationary and follow rests, wrench rack and wrenches, tool plan and double friction countershaft. The pedestal at the head of the lathe may be arranged to hold change gears, the leg at the foot of the lathe forming a reservoir for oil, holding sufficient to give ample circulation and cooling capacity.

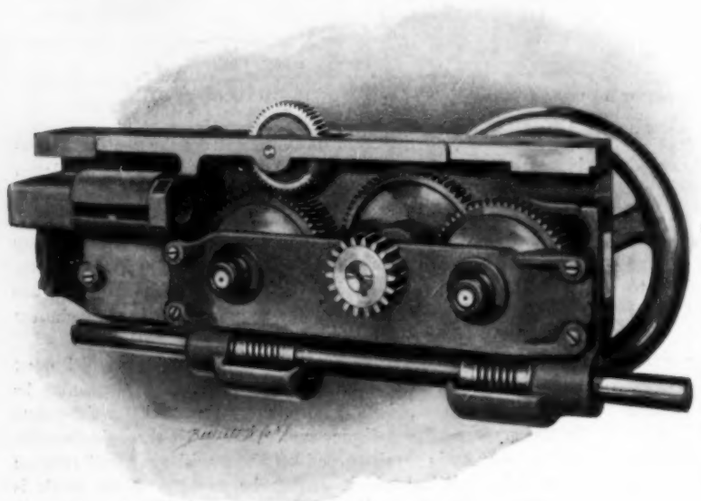


FIG. 3.—APRON WITH DOUBLE BEARINGS.

STEEL CASTINGS IN MODERN CONSTRUCTION.*

BY D. MACDOUGAL.

There has been no branch in the steel business that has come to the front in the last few years, as that of steel castings. This is especially true in the structural work, where almost every casting formally specified was cast iron, or where built up shapes were employed. This has now been changed, and steel castings are specified in the majority of cases. In the last few years castings have been designed by engineers and made by foundries, that were thought a few years ago impossible to make.

With a view of obtaining the best results not only as to the physical strength, but also to the wearing characteristics, we are constantly making experiments, until we have reached the stage where the modern steel foundry will make steel castings to almost any given chemical or physical specification, while a few years ago if you wanted to buy steel castings, you had to take what the foundry would give you, which was generally a soft steel casting, as they would not attempt to make castings to any given specification, and the use of the casting and the wearing qualities were not taken into consideration at all.

At the present time steel castings are made by several processes, i. e., crucible, Bessemer, Tropenas, acid and basic open-hearth. The crucible and Tropenas processes are usually employed in the making of small steel castings and railroad work where no finish is required. The acid open-hearth furnace permits of a more perfect control over the casting conditions than any known process. Basic open-hearth castings are now being made very extensively, that process having the advantage of making low phosphorus product from a cheap and poor quality of scrap and pig iron, but the disadvantage of a more lively metal in casting, harder to control and greater danger of honeycomb in the casting. In the acid open-hearth castings, the use of good stock determines the quality of the casting and in order to get good castings, free from the blow-holes and honeycomb, nothing but the best low phosphorus and low sulphur scrap and pig iron can be used.

Steel castings should be divided into three classes: 1. Very soft, such as used in electrical work. 2. Medium, such

*Read before the Engineers' Society of Western Pennsylvania.

as used in structural work, machinery, etc. 3. Hard, such as used in rolls, high pressure cylinders and castings that require great tensile strength. In ordering steel castings great care should always be taken in designating finished parts, also stating for what the castings are used, thus enabling the manufacturer to determine better what grade of steel to give his customer.

The most important factor in making steel castings is to properly head and gate them so that castings will be properly fed while the main body is solidifying. This is done with large heads above the casting which are of such a size that the metal will flow from the head down into the casting and supply the gap made by the shrinkage of steel.

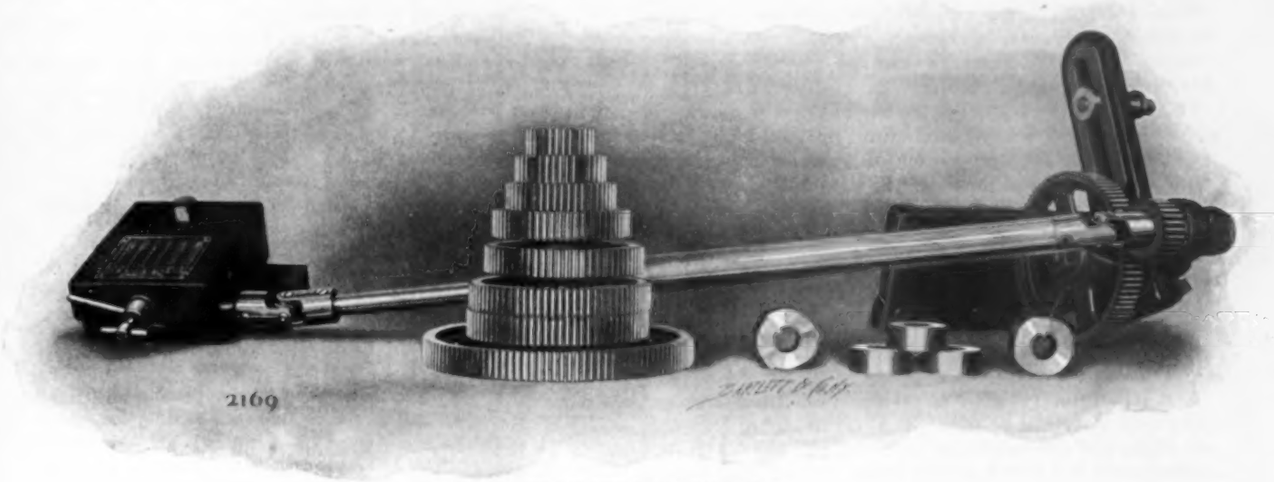


FIG. 4.—THE RELIEVING ATTACHMENT.

Castings of complicated shapes are very likely to be internally strained by the forces at work in cooling; part will be in tension and part in compression, and in designing the most important factor in intricate shapes is to have as near as possible a uniform thickness of metal. I have seen several instances where castings have broken after being out of the sand several days, awaiting the process of cleaning, owing to bad design.

This important point should bring steel manufacturers and engineers closer together than they now are, as I am satisfied time and expense could be saved by the designer consulting the manufacturer on intricate shapes, and many of the shapes we are called upon to produce could be more satisfactorily made.

Castings, as a rule, except special cases when made from acid open-hearth steel, need not be annealed, as almost any specification asked for today can be had without annealing. As we well know, the annealing process relieves the strains and while it increases the elongation and reduction of area, it reduces the tensile strength and elastic limit. To prove this, I made the following test of bars taken from the same heat of steel:

Test No. 1. Annealed gives us an elastic limit of 38,400 pounds, tensile strength 70,750 pounds, reduction of area 27 per cent, and elongation 32 percent in 2 inches. Bending bar, 180 degrees.

Test No. 2. Unannealed gives us an elastic limit of 39,050 pounds, tensile strength 73,050, reduction of area 19 percent, and elongation 28 percent in 2 inches. Bending bar, 145 degrees.

Thus you see that the unannealed test bar will answer for almost any specification asked for in the general work. These tests bars were taken from driving wheels cast in one of the regular heats made at the Pittsburg Steel Foundry, Glassport. The chemical analysis of heat was .26 carbon, .67 manganese, .23 silicon, .045 phosphorus and .027 sulphur.

The negotiations looking to a sale of the property of the Pennsylvania Furnace Co., at Sheridan, Pa., have fallen through, and there is no immediate prospect for any change in the present state of affairs. The property is closed and there is in the treasury between $40,000 and $50,000, and no debts. A director of the company states that were the stockholders to contribute $250,000 for working capital, the furnaces could be made to yield substantial net profits at the present market price of pig iron. The New England people, who bought a third interest in the company for $550,000, were told that the furnaces could make pig iron for $7.00 per ton. The cost was found to be $13.00.

Treatment of Burns at Mills and Shops.

The Iron Trade Review published in its issues of April 2 and June 4, 1903, details of the arrangements provided at various steel works, foundries and machine shops for first aid to the injured. Remedies for the alleviation of burns—in most cases linseed oil and lime water—were commonly referred to by the concerns contributing to that symposium. The following general observations on the treatment of burns will be found of value:

For a dry burn there is nothing better than equal parts of linseed oil and lime water. This makes the "carron oil" which the Welsh miners use in case of burns. In applying it shake the bottle, saturate a soft cloth with the mixture, and lay over the burn. Then cover closely with cotton batting or flannel to keep out every bit of air and secure the whole with a light bandage.

Burns may also be treated by covering with a thick layer of any bland oil, like vaseline, sweet oil, linseed oil, castor oil, butter, or almost any fat that is not rancid. Glycerine should not be used. It is too irritating. Soft powders, like flour and laundry or corn starch, may also be dusted on thickly and then bound up.

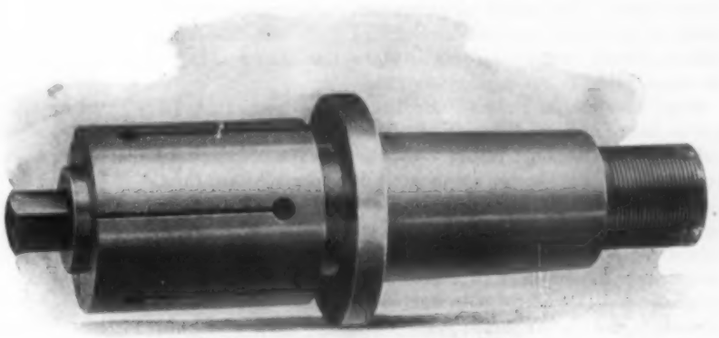


FIG. 5.—EXPANDING ARBOR.

For a scale or burn by steam no treatment gives better results than a dressing of saturated baking soda. Wring out cloths, lay on the burned surface, and as they dry pour on more of the solution.

The Lancaster Coal & Iron Co., Lancaster, Pa., has purchased for $100,000, the coal mines, coke ovens and lands of the Palos Coal & Iron Co., of Palos, Ala.

ECONOMY OF STEAM IN REVERSING MILL ENGINES.

BY V. E. EDWARDS.

Few American engineers have given much thought toward economy of steam in reversing mill engines. The accompanying diagram, Fig. 1, is an actual average indicator card from a blooming mill engine in one of the most prosperous steel plants in this country. It is probably but little worse than our average practice. In Germany coal costs more than here, hence they are far ahead of us in fuel economy. Many, perhaps most, of their reversing mill engines are condensing and they are now also compounding.

Compounding has been tried here and failed, largely for the following reasons:

First—In starting, the high pressure cylinders only were available and there was not enough power.

Second—When the steam did reach the low pressure cylinders there was too much power.

Third—When the bloom left the bite of the rolls the engine would jump dangerously, even with the throttle instantly closed, because of the large amount of steam remaining in the steam pipes, in the high pressure cylinders, in the receiver and in the low pressure cylinders.

Fourth—All this steam left in the engine after each pass was a total loss. With an engine making but one to ten revolutions between reversals, it is obvious that the extra steam thus lost must largely eliminate the economy expected from compounding.

Fifth—Much time was lost in stopping, reversing and starting.

A German firm (Ehrhart & Sehmer, of Saarbrücken) recently took a contract to rebuild a good condensing blooming mill engine and were not to get their pay until the new engine clearly proved that it had paid for itself. The mill had 32-inch

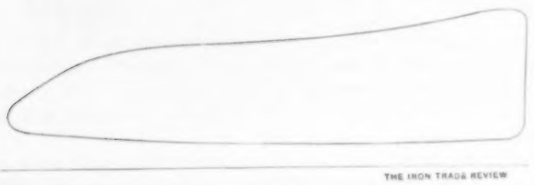


FIG. 1.—AVERAGE INDICATOR CARD FROM BLOOMING MILL ENGINE.

rolls. The old engine had cylinders 59 inches in diameter by 50 inches stroke, direct connected. The new cylinders were 47 and 72 inches diameter by 50 inches stroke, using the same condenser as was used on the old engine. Only four weeks were required to make the change. The reconstructed engine proved an instant and complete success. It has been running 24 hours per to the engine. The engine will start and stop as promptly and easily as a simple non-condensing engine. This apparently difficult result was readily obtained by the use of the new Rottman valve gear.

With this gear the point of cut-off in the low pressure cylinder is determined by the position of the high pressure throttle valve. When the high pressure throttle is wide open the low pressure cylinder takes steam nearly full stroke. As the throttle is closed the point of low pressure cut-off comes correspondingly earlier and earlier until when the throttle is entirely closed the point of low pressure cut-off becomes zero. Any steam then in the high pressure cylinder or the receiver is thus confined just where it is wanted to make a strong start a second later. This is clearly shown in Figs. 3 and 4, which give continuous diagrams from both the high and low pressure cylinders. These cards show irreproachable curves for the high pressure cylinder during the working period. On closing the throttle the expansion line instantly drops below the atmospheric line. Closing the throttle also sets the low pressure cut-off at zero. This means that the steam can not escape and the receiver pressure must rise until the engine stops as the high pressure cylinders are now acting as pumps and also as brakes, that is to say, that the momentum of the engine and roll train is taken up to be again utilized as work. The high pressure steam pistons pump the steam into the receiver so that again full pressure will be found in the low pressure cylinders when the engine starts afresh in either direction, as can be clearly seen from the low pressure diagrams. Thus the momentum of the engine and roll train which formerly was simply lost is now recovered. This also means a considerable saving. This saving will be further evident when taking into consideration the exceedingly small number of revolutions made by a blooming mill engine between reversals.

In order to make comparisons between the new and the old engines that should prove mutually satisfactory, a series of continuous indicator diagrams were taken both before and after compounding (see Figs. 2, 3 and 4). These long diagrams showed the steam consumption for each revolution of the engine for the entire period of rolling, say a 2-ton 12-inch I beam. The results of the tests are as follows. The saving in consumption of steam was ascertained to be:

18½ percent for light work.
30 percent for average work.
45 percent when rolling short heavy sections.

On regular work the savings were found to run from 20 to 30 percent, say 25 percent average. In this case 25 percent saving meant well over $20,000 per year saved. What would the saving have been in replacing the engine from which the card Fig. 1 was taken?

This first engine was such a complete success that neighboring steel plants promptly entered orders for four other similar engines.

Cleveland Machinery Market.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Sept. 2.

Manufacturers of machinery and jobbers usually report that August has been a dull month, as July was, but that the present outlook is favorable for good fall business. The bringing of natural gas to Cleveland from the West Virginia fields has caused an increased demand for gas engines. Manufacturers are a little slow in contracting for the use of the gas, as they fear the supply with not be permanent. However, some large industries are arranging to use it.

The Standard Welding Co., in its line of manufacture, seamless steel tubing, and seamless steel rims, for automobiles and horse drawn vehicle purposes, special electric welding, and articles manufactured by this process, finds a slight increase in business, within the past 10 days, and judging from the propositions that are before the company at the present time, on which it is negotiating, it would appear that business from this time on, will increase.

The Snider-Hughes Co., builder of pumping machinery, states that there has been some falling off in new business in the last 60 days, but present indications point to a renewal of trade this fall.

The demand for the product of the Cleveland Pneumatic Tool Co. has exceeded its anticipations for the months of June, July and August. Export trade has been good, and many of the large concerns to which it is selling are erecting bridges and other large structural improvements which constitute field work, and have bought freely.

The Cleveland Punch & Shear Works Co. has found quite a falling-off in business in its line during the past two months, but conditions point to better trade at present.

The Chisholm & Moore Mfg. Co. reports that its trade this summer has been very much greater than the average of the preceding summers. The plant is running very full in every department. In the foundry, it has an abundance of work at prices ruling in some cases a little higher than a year ago, and in all cases quite satisfactory.

The National Acme Mfg. Co. reports that business is keeping up very well, both in the product and machinery lines. Orders have been on the increase, but this is only natural with the opening of the early fall.

The Cleveland Crane & Car Co., Wickliffe, reports that orders received during August were heavier than in the corresponding month last year.

The Chase Machine Co. finds buyers cautious, but reports rather more business than last year. The company has bought 8,400 square feet of land adjoining the shops on the corner of Elm and Main Sts., but does not contemplete building at present.

The Vulcanus Forging Co. is changing its product from forgings of all descriptions to rivets and air brake pins ex-

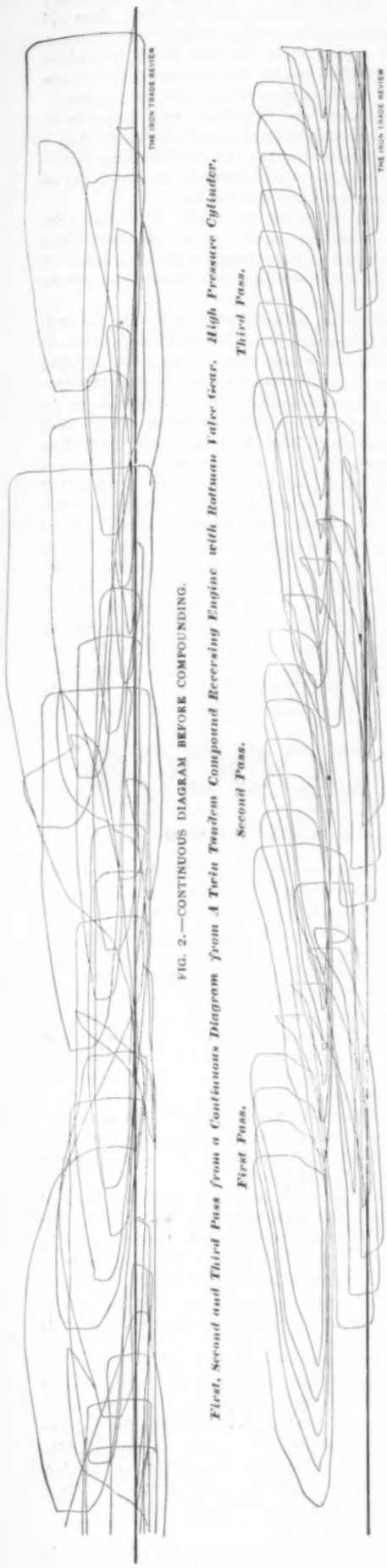


FIG. 2.—CONTINUOUS DIAGRAM BEFORE COMPOUNDING.

First, Second and Third Pass from a Continuous Diagram from A Twin Tandem Compound Reversing Engine with Rottman Valve Gear. High Pressure Cylinder.

First Pass. Second Pass. Third Pass.

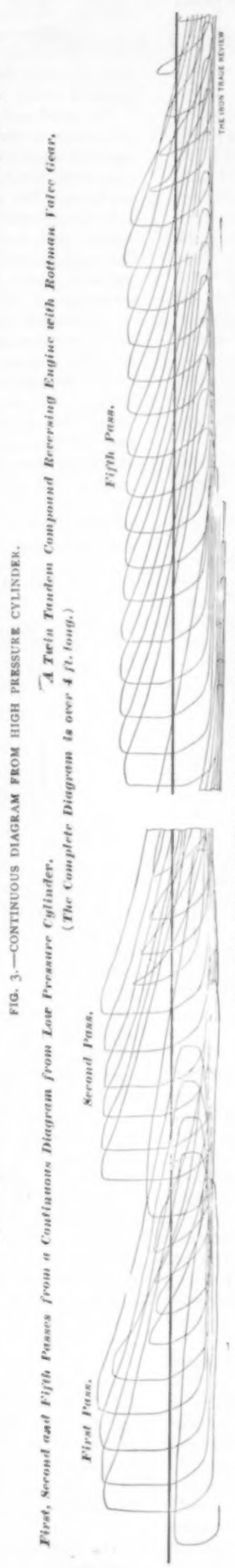


FIG. 3.—CONTINUOUS DIAGRAM FROM HIGH PRESSURE CYLINDER.

First, Second and Fifth Passes from a Continuous Diagram from Low Pressure Cylinder. A Twin Tandem Compound Reversing Engine with Rottman Valve Gear. (The Complete Diagram is over 4 ft. long.)

First Pass. Second Pass. Fifth Pass.

FIG. 4.—CONTINUOUS DIAGRAM FROM LOW PRESSURE CYLINDER.

clusively. It expects to shut down for a month or six weeks to make the necessary repairs and changes in machinery.

The Cleveland Elevator Bucket Co. has been very busy during the past year and reports the present outlook very encouraging.

Foote, Burt & Co. report that July business was poor, but that August has been almost up to any of the best months of the year in orders received and leaves the company with plenty of good inquiries and prospects for a first-rate September. Orders have been well distributed, coming all the way from Eastern manufacturing companies for light tools to heavy railroad tools.

The C. O. Bartlett & Snow Co. finds that, after a lull of two months, inquiries are beginning to come in more plentiful, and from all appearances the company is led to believe that the downward tendency in prices is stopped; that from now on prices will be no lower, and that a good business will be done by all substantial manufacturers. The company believes that labor conditions are much more favorable.

The Upson Nut Co. reports that business is quiet, but believes there should be a good volume in the coming months. Prices are lower than they should be, but are about on a line with the general declines in heavy material.

The Marshall & Huschart Machinery Co. states that its summer business up to Aug. 1 was exceedingly large, but the month of August has not been up to the standard. However, business for the last week has been very much better than the preceding weeks of this month, and the company looks for a good fall trade.

The Winton Motor Carriage Co., Cleveland, has completed the erection of four large additions and its plant is practically closed now for inventory and rearrangement of machinery. A large amount of new machinery has been purchased and additional equipment will be put in, in the near future.

The Federal Mfg. Co., Cleveland, is preparing to offer to the automobile trade a new kind of sheet metal stamping work. Instead of using frames built up of wood and channel or angle iron, the company has devised a plan of stamping the side and end pieces out of sheet metal. No. 10 gauge sheet is used to do this stamping. The company designed one of the largest sheet metal presses ever constructed.

The Ray Automatic Machine Co., which removed from Cleveland to Berea, O., some time ago, has added a number of new machines and now has a complete equipment. The company is one of the most extensive manufacturers of automobile parts in the world, and also makes automatic nut machines, cold punched nuts and the Vulcan annealing putty.

The General Automobile & Mfg. Co., of Cleveland, recently placed in the hands of a receiver, has been manufacturing gasoline automobiles for about two years. Lack of capital and threatened litigation are given as the reasons for the failure. The receiver has asked permission of the courts to borrow $10,000 to complete into finished product the material now on hand. It is probable that a new company will be organized to carry on the business.

The City Machine Co., Cleveland, is manufacturing a hydraulic jack for street railway repair shops. A large number has recently been sold to Cleveland, Detroit, Chicago, Dayton and other street railroad companies.

The Gas Machinery Co., Collinwood, has let the contract for a new building, 80x100 feet.

The Craig Ridgway & Son Co., Coatesville, Pa., has booked a large order for hoisting equipment to be installed in Germany.

Economic Sheet Metal Working With Punch and Die.

BY "METAL WORKER."

The development of the "gang" or "follow" principle in dies for the rapid and cheap production of an endless variety of sheet metal articles and parts has progressed steadily; until today results along this line are being accomplished which are, to say the least, astonishing. It is in the production of little, insignificant parts, however, that the most attention has been given, by those engaged in the manufacture of sheet metal goods, to the devising of dies which will accomplish the entire completion of the article required in one "operation." Thus, in some shops, we see a roll of thin sheet metal being fed to dies, and articles turned out at the other end completely finished; having been pierced, shaped, drawn, bent and embossed during their progress across the die face. In conjunction with dies of this class the automatic roll feed is most valuable; as the press can be speeded to as high a rate as it will stand, with the assurance positive that the feed will perform its duties accurately in the feeding of the stock across the die-face.

As an example of what is being accomplished in the devising of means for the production of sheet metal articles in one operation, I illustrate and describe here a "gang" die of very interesting type. A number of these dies were designed and

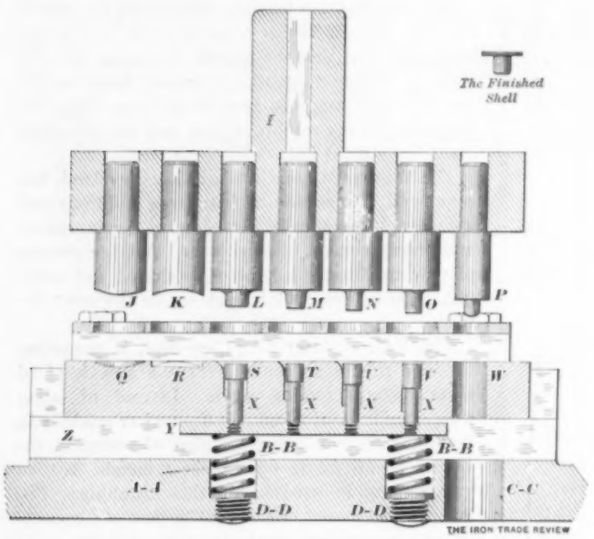


FIG. 1.—PUNCH AND DIE FOR PERFORMING SEVEN OPERATIONS SIMULTANEOUSLY.

put into successful operation by the writer not long ago for the production of one of two parts of a metallic button. They will be found the best to adopt for the manufacture of small buttons, eyelets, shell rivets and anything of like nature, that it is necessary to produce cheaply and in large quantities. To secure the minimum cost of operation, the stock is usually fed automatically by means of a fine tooth ratchet roll feed, thus securing fine adjustment of the stroke.

In brass work, where we can get our stock in long lengths, or in rolls approximately uniform in width, a die of the type shown in Fig. 1 will run off the entire strip or roll without the possibility of error, thus allowing of the press attendant looking after several presses and keeping them running continually.

Now, let it first be understood that in order to draw sheet metal into any form or shape, it is first necessary to provide a blank. And when the article drawn is produced progressively, as in the die shown here, it is necessary, first, partly to cut the blank from the strip so that it may decrease in diameter with the drawing in such a manner as to in no way disturb the relative distances between the centers of the different operations required to produce the shell. This is the point which many die makers forget; so that the dies prove defective where means are not provided for first *partly* cutting the blank, and there is no possibility of locating the successive operations in their proper positions, because of the metal which goes to form the cup being drawn sideways and lengthwise in the first drawing. And as this will continue with each draw there will be no likelihood of accurately locating the different operations. The way in which a gang die of this kind should be made in order to attain the desired results, will become apparent to the practical reader in the description of the tools here shown.

The punch and die were used to produce small shells like the one shown at the upper right hand corner of Fig. 1. And it required seven workings to produce the shell, finishing it complete from flat stock at the rate of 40,000 to 50,000 per day of ten hours. The stock used was .030 soft brass.

As the illustrations of the die and punch show clearly the various parts used in the construction of the tools, and Fig. 2 the results accomplished at each operation in the progress of the strip across the die face, very little description will be necessary.

The stock is first cut, as indicated at A, Fig. 2, by punch J, Fig. 1, and then at B by punch K. Thus, the blank is produced so as to remain attached to the strip and to allow of being drawn and decreased in diameter by subsequent operations without affecting the position of its center in relation to the strip. This will allow of the metal being drawn into the shell and still leave a margin to hold the cups together and allow of feeding them along for the next operation.

The stems of the seven punches J, K, L, M, N, O, and P are let into reamed holes in the holder I and are fastened with setscrews, not shown. The punches were all hardened, drawn and carefully and accurately lapped to shape and size. The die is finished in the usual manner, formed counterbores being used to finish the drawing and sizing dies. Q is the first cutting die; R, the second; S, the first drawing die; T, the second; U, the third; and V, the sizing or finished drawing die, while W is the blanking and trimming die. Each of the drawing dies is furnished with a plunger, which is hardened and drawn and let into the pad Y. These plungers serve the double purpose of holding the metal while being drawn and of

FIG. 2.—THE STOCK AS PUNCHED.

stripping it from the dies afterwards, thereby leaving the stock free to be fed forward to receive the next operation. A channel planed lengthwise in the bolster A-A, at Z, allows the pad Y to work up and down with the action of the press ram. The two springs, B-B B-B, keep the plungers up with sufficient tension to hold the metal securely between their faces and the faces of the drawing punches, while the drawing and reducing is being accomplished. Their pressure is adjusted or regulated by the headless screws D-D D-D. The trimming or blanking punch P has a pilot pin, which fits the last drawing snugly and locates it true and central for being trimmed and blanked clean off the strip.

As the results accomplished by the use of such tools as are herein described and illustrated would require three or more operations if the simpler tools were used, it is no hard matter to figure out what the saving is.

In conclusion I might state that there is any variety of small drawn, formed, or embossed sheet metal work that could be produced more accurately and in half the time by the use of just such dies as that shown here. In order to succeed with these tools, however, always remember, before attempting to draw and form cups progressing from the strip, to *provide means for partly cutting the blanks from which to draw the cups.*

Two additional papers are announced for the meeting of the Iron and Steel Institute at Barrow, Eng., this week, one by J. L. Shaw, of Whitehaven, on "The Probability of Iron Ore Lying Below the Sands of the Dudden Estuary," and the other by Prof. Stansfield, of London, on "The Over-Heating and Burning of Steel." Prof. Stansfield is a Carnegie research scholar.

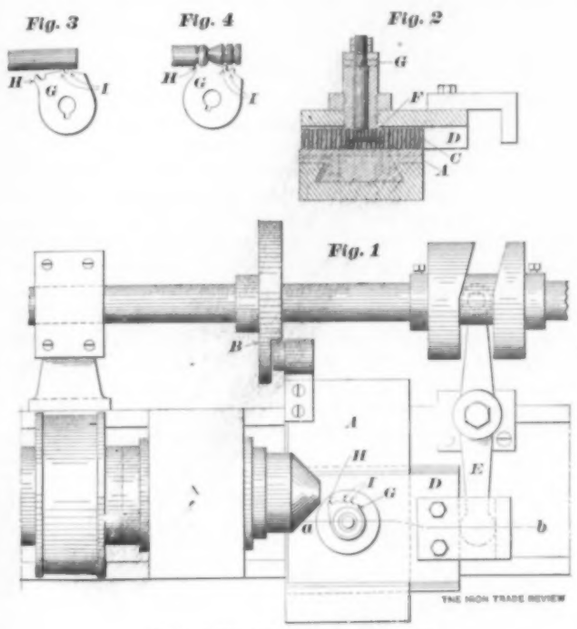
The National Enameling & Stamping Co. has taken over the Whittaker & Weber Mfg. Co., of St. Louis. For this purpose $150,000 additional stock was issued.

Some New Things for the Shop, Chiefly by Way of the Patent Office.

A Cutter Kink.

The cutting of a special shape in the screw machine is usually accomplished by a formed cutter which matches the contour of the finished piece to a considerable extent. The chip extends across the face of the cutter and the steady strain in breaking up the shaving of such a width is the cause of much of the "chattering" which often mars the finished piece. Quite frequently the toolmaker meets the difficulty by dividing up the strain among two or even more cutters—a light shaving being taken over the work as a finishing process and thus bringing all the cutters with their little individual peculiarities into harmony. This method has considerable vogue but lacks the scope of the hand operation where the tool commences to cut at the one corner and travels nicely to the other. The skilled hand not only feels the amount of strain deftly but breaks up the chip with a nicety of touch that leaves a smooth surface. This hand-operated tool is, however, out of date for repetition work and it devolves upon the designer to meet this requirement.

Here comes in Sidney C. Hills, of Torrington, Conn., who in a recent patent proposes the improvement of the screw machine by the addition of "a cutter which will produce shapes requiring deep cuts with great ease."



IMPROVING THE SCREW MACHINE.

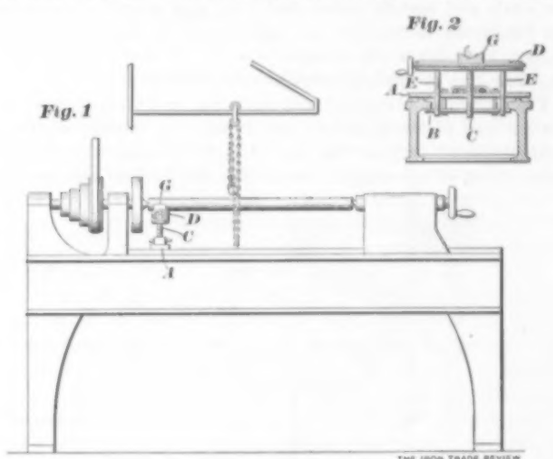
The arrangement of the device is "substantially as described" and illustrated in the engravings, Fig. 1, 2, 3 and 4. The plan of the lathe to which the patented improvement has been applied is shown in Fig. 1, and Fig. 2 is a sectional view on the line a—b of Fig. 1. Fig. 3 is a plan view of the formed cutter as presented to the rod preparatory to making a cut, and Fig. 4 is another view of the cutter after it has been rotated by the post, immediatedly following the formation of the required shape on the turned piece and preceding the cutting of the formed article from the end of the rod.

There is a slide A fitted to the bed of the rest and this is moved by the engagement of a projection on an arm secured to the slide, with a cam B mounted on a shaft running parallel with the main spindle of the lathe. This cam is intended to draw the slide inward and at a predetermined time move the slide out by means of a lug. The slide A has an undercut recess which has in one side a rack C. In the recess is a slide D which can be moved back and forth by a lever E turned by a grooved cam on the rear shaft. The slide D has a vertical sleeve and through the sleeve is a post having at the lower end a pinion F which stands below the face of the slide D and meshes with the rack C. The upper end of the post is reduced in diameter and upon it is mounted a cutter G which is keyed to the post and bears on the top of the sleeve. The cutter is also secured in place by means of the washer and nuts.

The slide A being forced outward by the lug in the cam B, a rod is fed forward through the chuck and when clamped in position the drill or other tool may be advanced to operate upon its end. At the same time the cam B draws the slide inward and moves the cutter G, which is formed with two cutting projections, toward the rod and cuts two grooves as shown in Fig. 3. As the cutter advances toward the work the slide D is moved by the lever E in combination with the grooved cam and as it advances, the pinion F engaging with the rack C, turns the post and in this way rotates the cutter. The cutter G has at one side a cut-off point H, the edge of the cutter between the projections H and the cut-off point I being of a form to give the required shape to the article being cut. When the cutter G has been turned sufficiently to sever the formed and finished portion from the rod, the slide A is thrown outward by the cam B, removing the cutter from the rod and permitting the ejection of another length of stock. The withdrawal of the slide D at the same time turns the cutter to the first position. The shaping of the cutter for any desired form will make a pretty proposition but in the way of getting the scheme in working order not more of a job probably than that involved in some well known automatic machines.

A Mechanical Helper.

The mere putting of a shaft or any other piece of metal into a machine tool for the purpose of removing chips, etc., takes an amount of time which is more or less objectionable. Exactly as the weight of the piece and the shop facilities for heavy and speedy lifting are the chances of cutting down the expense of doing work of a metal removing nature and the longer the time taken, to get the job ready for cutting chips the less effective the service of other time saving expedients. The use of sturdy steel of high grade cutting power and massive tools to support the heavy strains is handicapped by inefficient means for getting these improvements into operation with a minimum amount of delay.



ANOTHER REST.

Charles E. Brown, of Allegheny, Pa., has grappled with the proposition and states the case as follows:

"In the centering of heavy shafts or other pieces of material in a lathe it is necessary for the lathe man or attendant to have a helper to hold one end of the shaft or piece approximately centered, while the lathe man or attendant centers the opposite end of the shaft or piece. When the lathe man or attendant has centered the one end of the shaft or piece,

he then goes to the end which is held supported by the helper and centers this end. This method, it will be observed, requires the assistance of a helper when heavy shafts or other pieces are being placed in the lathe."

That is just where the shoe pinches and the inventor proposes to dispense with the necessity of the helper and provide other means for supporting one end of the shaft while the lathe man is busy at the opposite end. The invention comprises a rest which is adapted to be placed upon the regular V-ways of the lathe bed. This rest has an adjustable block to receive the shaft and means is provided for adjusting this block vertically and laterally.

Fig. 1 is an elevation of an ordinary lathe, with the attachment in place and Fig. 2 is a vertical section through the lathe bed and the attachment. The carriage is not shown in the engravings but enough of the lathe is given to indicate what the inventor has especially in view. The heavy shaft is suspended by a chain from a crane or any other support and one end is put in line with the neighboring center by means of a suitable rest. This is constructed as follows: There is a cross bar A which rests upon the V-ways of the lathe bed and is clamped by bolts to a bar which engages under the edges of the bed. A screw C passes vertically through the cross bar A and the clamping piece B. This screw has a hand wheel for adjustment. A channeled support D is carried on the upper end of the screw C and has closed ends to receive a horizontal adjusting screw. The screw passes through a nut moving in the channel of the supporting bar D and is in one piece with the block G. The block G is cut out to receive the shaft. Guide rods E are employed to prevent rotation of the supporting bar.

The method in which the device is used in supporting the piece will be understood from the engravings and it is quite likely that for many jobs some time will be consumed in getting the device on and off the lathe.

A Shaft Bearing Adjustment.

The bearings of the grinder made by O. S. Walker & Co., of Worcester, Mass., have been patented and are illustrated in Figs. 1, 2 and 3. Figs. 1 and 2 are sectional views of the shaft and spindle boxes and Fig. 3 is a section through the headstock spindle box at right angles to the axis of the shaft. This headstock spindle box has a ring oiler by the way but this is omitted from the illustration.

The principal advantage gained by the invention is the important one of being able to use a box and spindle within a straight sleeve without the use of tapers of any kind or the employment of drawing in nuts. The device has been tried a sufficient length of time for the exposure of any possible faults and has given satisfactory results. The upper part of the box A acts as a cap, the necked out portion at C serving as a hinge, and may be adjusted on the shaft B by the aid of the screw F without danger of distorting the box.

The gib E forms a check against the screw F and the whole bottom half of the box is always held solidly against the lower side of the housing. The nut G is threaded to the box, provides end adjustment and acts as an oil retainer. The adjustment of the boxes is accomplished by loosening the nuts G and the screw F and H. The nut G is then pushed in to take up end play and the box adjusted for diameter by means of the screws F and H, the one acting as a check for the other.

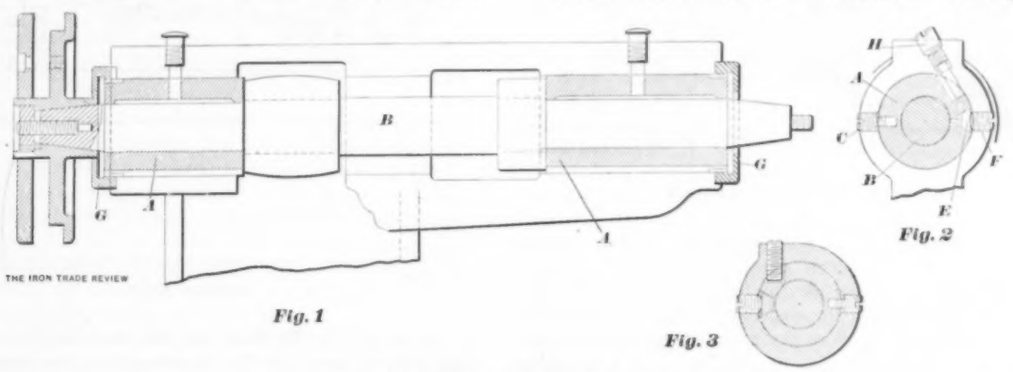


Fig. 1 Fig. 2

Fig. 3

NOVEL ADJUSTMENT FOR SPINDLE BOXES.

A Starting Rig.

A belt shifter scheme is described in *Fielden's Magazine*. Fig. 1 is an end view and Fig. 2 is a side elevation. Fig. 3 is a general plan of the device illustrating the attachment of the belt eye and shifter rod to the crank. The writer of the article gave the experience of one shop with the different methods of starting and stopping a machine. One way involved the use of two chains hanging from the ends of a double lever with weights attached to the bottom. To start, the workman pulled one chain; to stop, he pulled the other. Unfortunately the system did not invariably work smoothly, the levers got too far over the center occasionally and the operator had rather an awkward time swinging the chains.

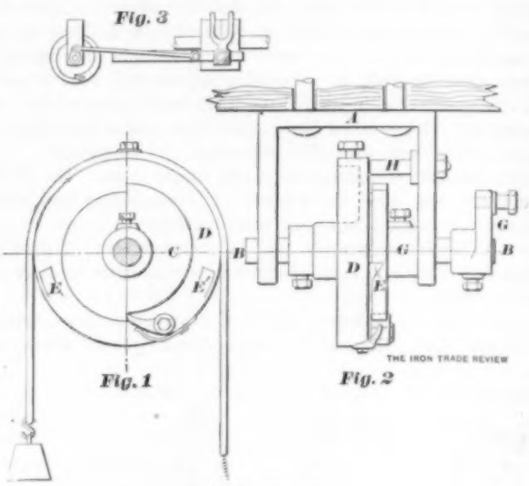


Fig. 1 Fig. 2

A BELT SHIFTER.

The crisis arrived when a workman got his coat fast to a rough shaft turning in the lathe. He could not reach the chain to advantage and the boy summoned seized the wrong one. There were several seconds of confusion and then the lathe was stopped, the tearing of the coat preventing a much more serious condition for the unfortunate workman. But for the weakness of the coat these few seconds would have made the difference between a narrow escape and a painful accident or worse. The affair convinced the firm that something better in the way of a starting rig was necessary and the device described was designed and constructed:

"A bracket A is made of suitable shape for securing near the shipper bar; the shaft B passes through it, working freely in its bearings. On the shaft B is secured the cam C, also the crank G at the outer end. The disc wheel D revolves freely on the shaft but it is checked in its movement by the stops E coming in contact with the stud H. A catch swivels on a stud in the disc wheel and engages with a tooth of the cam. A strap passes over the rim of the wheel and is secured to the wheel by a set screw. One end of the strap carries a small weight and the other end has a cord with handle attached. The crank G is connected by a rod to the shipper bar as in Fig. 3.

"As shown in the sketch the strap fork (or belt eye) is in mid position. By pulling down at the handle, the cam is turned through a quarter of a circle until the snug (stop) E

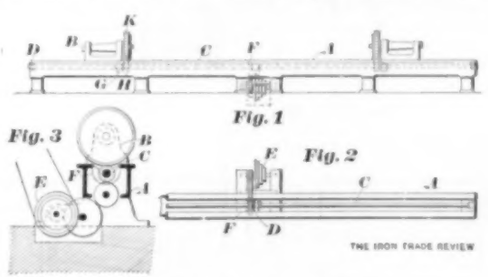
meets the stud. The crank is now on dead center, the strap on the fast pulley and the lathe started. The operator lets go the handle, the weight swings the disc wheel around until the snug E meets the stop stud. The small spring has now forced the catch into the other tooth of the cam and the apparatus is ready for the next pull, which will turn the shaft round another half turn and so stop the lathe. If a drag is needed to keep the shaft from turning back with the disc wheel, an extra stop washer bearing against the bracket and springing it slightly will afford it. It will be seen that by this arrangement the same pull at the same handle will start the lathe if it is stopped and stop the lathe if it is started. It may also be noticed that in each position of the strap fork the crank is on the dead center and there can be no creeping of the fork from its position until the crank is turned."

The device is simple and effective but something even more powerful than these admirable qualities is required to oust the plain shipper of the shops from the position it has so long held. There is a solidity about the common shifter that would not seem practicable with the handled belt described. Whether it be the wooden lever or the iron rod, the operator gets his bearings very soon and reaches for the handle confidently as by second nature when his sight and mind are busy with the work in the machine. The thing desired seems to be a handle large enough to have resistance, something to loom up akin to a crumb of emery in an inflamed eye, and the outstretched hand can grip with certainty and speed. A chain may dodge, elude the grasp and the moment's loss means much in many a machine shop job. Some such reason may account for the prevalence of the old-time belt shifter. There has been no lack of ingenious devices wrought out for this very purpose but the results have not been encouraging. The old form is familiar—few parts, readily repaired and needing no oil; a combination of positive and negative virtues that is hard to beat.

A Shafting Lathe with Double Drive.

An English patent on a shafting lathe is the joint invention of John Walls and the Unbreakable Pulley & Millgearing Co., of Hyde Road Engineering Works, West Gorton, Manchester. The invention as described in the *Mechanical Engineer* has the object of eliminating the twisting strain in turning shafts of considerable length. This is the main object as described but at best it would seem to halve the torsional strain by driving from each end of the piece instead of the more usual single headstock drive. Double drives are not rare, however, and the peculiarity in the present invention lies rather in the attempt to equalize the strain on each end of the machine.

On reference to the illustrations, Fig. 1 will be seen as a



EQUALIZING THE DRIVE.

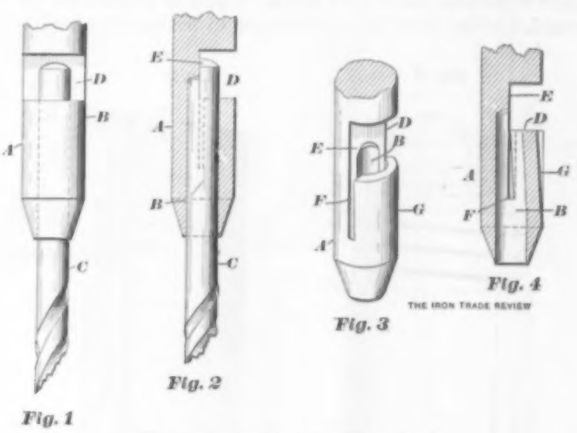
side elevation of the lathe, Fig. 2 is a plan with the headstocks removed and Fig. 3 is a cross section through the bed of the lathe at the middle of the length. A is the bed and upon it are the headstocks B. These headstocks are capable of movement along the bed. The power shaft C passes lengthwise of the bed and is carried in bearings D. With the exception of these bearings D, the shaft C is splined the entire length. Rotary motion from the driving cone E is transmitted by suitable gearing to the pinion F which is keyed to the driving shaft C at a point midway between the ends of this shaft. There are two bearings G on the underside of the headstocks B. These bearings have sleeves to which are fastened the spur pinions H; through the sleeves passes the driving shaft and by means of the spline and the sliding keys or feathers on the inside of the sleeves, the spur gears meshing with the teeth on the peripheries of the face plates K are caused to rotate.

The method and action of the device is as follows: The headstocks K are moved to an equal distance from the driving gear F and far enough apart to accommodate the piece to be turned in the lathe. The ends of the piece are then secured to the face plates K. The driving cone E operates the shaft C from the middle of its length by means of the pinion F and so distributes the twist in the shaft.

A Drill Chuck.

Edward C. Wysong, of Eaton, O., has invented a drill chuck for tools having a straight shank. Fig. 1 is a side elevation of a drill holder or chuck embodying the improvement and illustrating the application of the same to a drill. Fig. 2 is a central section of the chuck and a side elevation of the drill. Fig. 3 is a perspective view of the chuck detached from the drill and Fig. 4 is a detail view of the chuck, the full lines showing the normal position of the spring clamp and the dotted lines illustrating its position when pressed out by the insertion of the drill into the bore.

The body of the chuck is indicated at A and has a bore B for the reception of the shank of the drill C. The diameter of the bore B corresponds with the diameter of the drill shank



GRIPPING STRAIGHT SHANK DRILLS.

and the body is cut away at one side as shown at D, the notch D intersecting the inner end of the bore B and extending some distance in the rear for engagement of the flat face E formed at the end of the drill shank. The saw cut F extends lengthwise of the chuck and forms a spring clamp G, which grips the inner end of the shank when the drill is pressed into the bore of the chuck.

The chuck is adapted for use in connection with a number of drills of the same diameter of shank and when the drill is forced home into the chuck with the flat E in engagement with the inner walls of the cut away portion D, the drill is prevented from displacement by the spring of the clamp G. The outer end of the chuck is intact and sustains the thrust coming upon the drill when in use, and in that manner relieves the clamp G of all strain except that necessary to hold the drill in place.

The Saving of Screw Stock.

The cutting of screws or screw blanks from the rod involves some waste of material and an attempt to bring this loss to a minimum is the process of severing metal bars invented by Walter B. Pearson and Charles E. Roberts, of Chicago. The item of a ⅛-inch cutting-off tool at work on screws one inch long amounts to 12 percent of the stock as a contribution to the scrap heap. Of course the percentage of loss varies with the length of the screws, increasing as the length of the screws decreases and vice versa, but in all cases amounting to a large percentage of waste material. The process proposed consists in first partially severing the bars of stock at the desired point by cutting a V-shaped groove there. After the stock has been partially severed in this manner the sections of the bar on opposite sides of the groove are turned or relatively rotated to each other upon their common axis so that the bar is wrung off. This twisting off of the piece may be effected by wrenches applied to the stock or in the case of a screw machine the

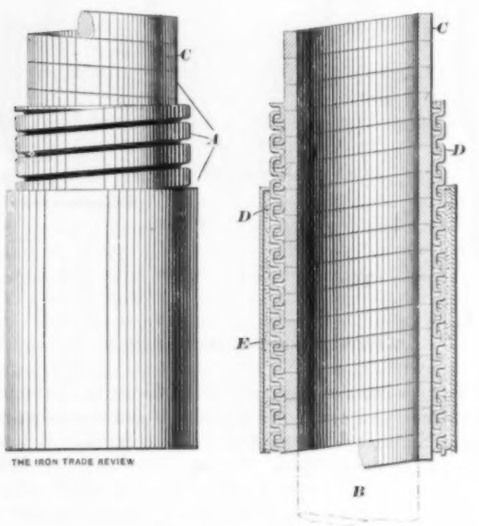
separation may be made by grasping the projecting end in a stationary chuck supported in proper position opposite the end of the machine spindle.

Flexible Shafting.

Armand Janet, of Paris, has an improvement in the arrangement of a flexible shaft in a non-rotating cover which also serves as a chamber for lubricant. Fig. 1 is an elevation of a sleeve section constructed according to this patent, and Fig. 2 is a longitudinal section through the center, the flexible core or shaft being shown in dotted lines.

The flexible hose A is made of a metal strip D rolled to an S-form in cross section and wound spirally so that the edges will interlock. A packing E, asbestos cord for example, is introduced. A helical spring C is placed between the core of the flexible shaft and the metallic hose in order to counteract the frictional wear and tear caused by the core B. The helical spring C is wound oppositely to the metallic hose to take up the wear caused by the frictional parts and this without unduly interfering with the flexibility of the whole arrangement. The irregular local pressures are, however, readily communicated through the helical spring as the latter may expand in diameter and thus affect the joint of the metallic tubing. A cover F of leather or canvas is provided to meet the last objection. The cover is fastened around the metallic tubing to prevent the destruction of the latter by the expansion of the diameter, and at

Fig. 1 *Fig. 2*



A FLEXIBLE SHAFT.

the same time it is shielded by the asbestos packing from the oil or lubricant leaking through the joints of the metal tubing.

The Improvement of Belt Conditions.

The treatment of belts is about as severe as can well be imagined. There are but a limited number of mechanics who have given the lusty leather of the shops any special investigation in regard to what may be done to increase the efficiency of belting. Belts run under all sorts of conditions, and in spite of the fact that so much depends upon the surface, the tension and joints, in order that the machine may receive steady power for the longest time, very many shops permit anyone to have a general license to tinker with them. The edge of the shifting belt rubs frequently, if not all the while, against metal and this shortens the effective life. Belt forks have been made with the sides mounted on ball bearings so that the wear would be reduced to a minimum, but the device was too expensive and elaborate for more than a very limited use.

A recent invention by Edwin P. Hayes, of Tower, Mich., does not introduce the ball bearing, it is true, but has instead what may be termed a roller bearing. Fig. 1 is an elevation of a complete device made in accordance with this invention and showing the belt in cross section. Fig. 2 is an enlarged vertical section through the axis of one of the shifting brackets. The arrangement of the shifter rod, handle and forks in connection with the belt will be easily understood. The shifting brackets or forks have on their inner faces an opening A which extends for a greater part of the length and opens into cylindrical seats. These seats have anti-friction rollers B fitted in them. The rollers rest against the belt when shifting same and are held in place by means of a plug inserted in the bore of the brackets. A screw C is let through the wall of the

Fig. 1

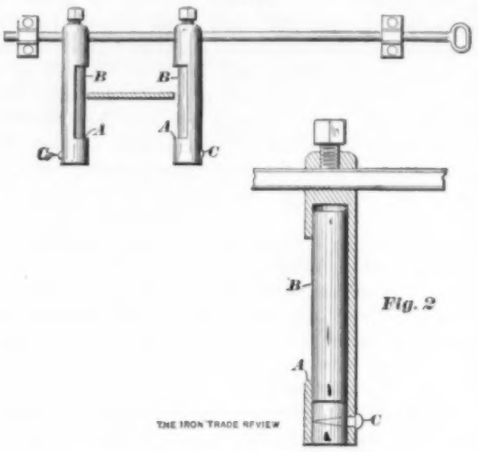


Fig. 2

BELT FORKS WITH ROLLER BEARINGS.

brackets and projects into the plug so that in case the rollers become worn or unserviceable they may be removed and new ones supplied.

A Taper Attachment.

The patent of Frank R. Lee, of Leadhill, Ark., relates to a taper attachment for lathes, "susceptible of quick and easy application to ordinary turning lathes and one of which, while very simple and inexpensive in construction, is efficient and reliable in operation and is possessed of a considerable range of adjustment." The contract to this end is met by the device offered in Fig. 1 showing a plan view of a portion of the lathe with attachment in place, and Fig. 2 a transverse section taken in a plane at one side of the lathe carriage. The taper attachment comprises cross bars A, each having a curved slot, and having at the ends clamping plates with nuts and bolts so

Fig. 2

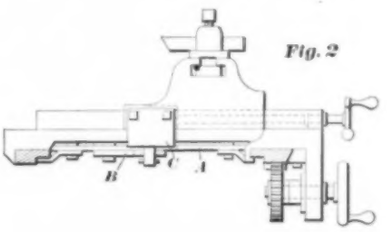
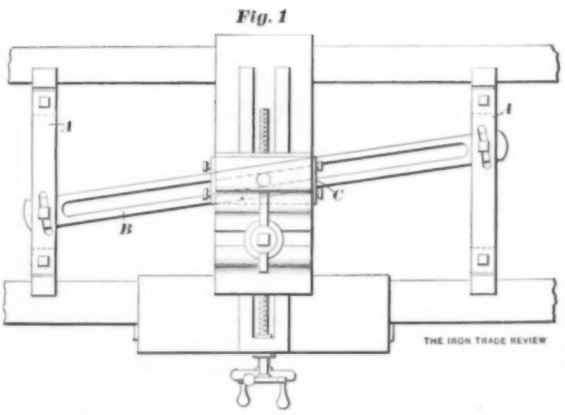


Fig. 1



RIGGING UP THE LATHE FOR TAPER TURNING.

that the device may be fixed on the shears of the lathe. A taper bar B extends between the cross bars A and has a slot for the greater part of the length. There are bolts through the slots in the bars A and the ends of the bar B. A clevis C slides in the slot of the bar B and straddles the carriage and slide to which it is attached by screws. The lathe shown does

not have the compound rest advisable for a contrivance of this kind and in other respects the device suggests the query as to patent requirements. A scheme of this sort would be so likely a product of the average workman with crude repair or jobbing shop demands and facilities that it seems of doubtful novelty. The Patent Office has apparently no hesitation about the matter.

A Molding Machine.

A patent recently granted to J. P. Appleby, of Hopkins, Minn., is an improvement on an earlier invention. These patents cover adjustable guides used on the machines and provide for adjustability for the purpose of taking up wear and for the necessary adjustment after changing patterns.

The guides in the original patent were "preferably" square cold drawn steel with a trunnion turned on each end. A strap of flat iron is driven onto the trunnions and the strap has holes in each end slightly larger than the screws which pass through them and hold the strap in position upon the frame of the machine. The adjustment was obtained by tapping the guides lightly with a hammer.

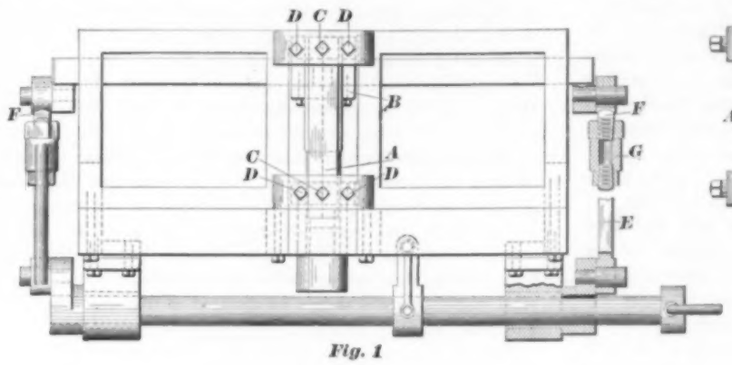


Fig. 1

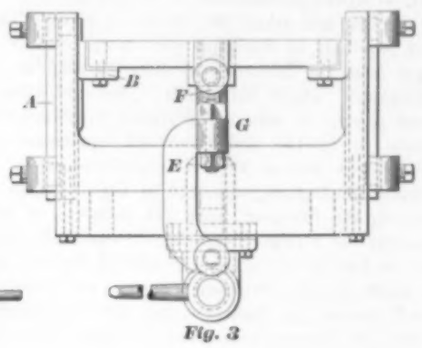


Fig. 3

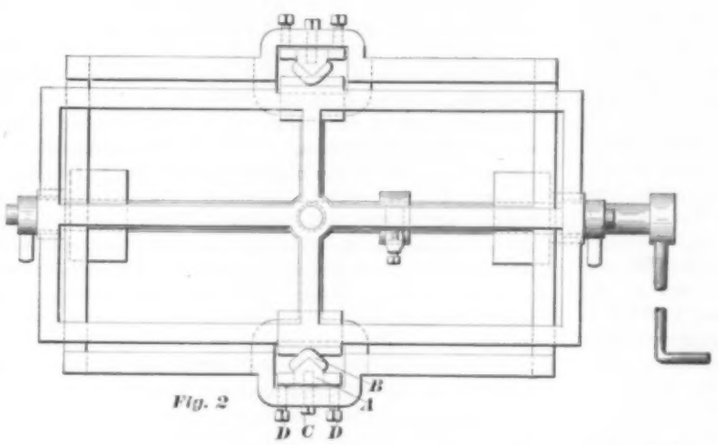


Fig. 2

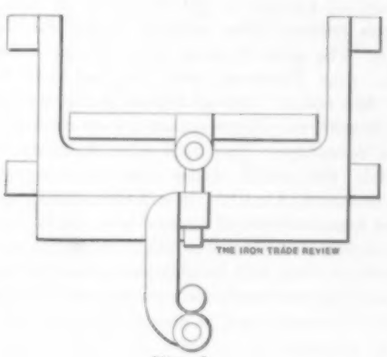


Fig. 4

ADJUSTING A MOLDING MACHINE.

The recent improvement on this method provides for a guide having universal adjustment, and in place of the rapping of the guide with a hammer, three screws are employed. One of these secures the guide in position against two other screws which have been used to locate the guide by forcing it up to the guide gib.

The construction is shown in the illustrations. Fig. 1 is a side elevation with some of the working parts in section. Fig. 2 is a plan and Fig. 3 is a side elevation with the pattern carrying frame at the highest point. Fig. 4 is a side elevation showing the carrying frame at the lowest point, this being the position of the machine after the pattern is drawn.

In Fig. 2 A is the guide and B is the guide gib which is secured to the pattern carrying frame, as indicated in Fig. 3. The adjustment is obtained by the screws C and D. An adjustment of the height of the pattern is provided by the lifting links E. These links are made in two parts, the eye bolt F with the lower end passing through the sleeve G, and a nut above and below serving to lengthen or shorten the link as may be required. The machines have been introduced in the foundries of the Plano Mfg. Co., of Chicago, and the Minneapolis Threshing Machine Co., of Hopkins, Minn.

ANDREW CARNEGIE ON STEEL-MAKING RECORDS.

Below is given the presidential address of Andrew Carnegie in calling to order the autumn meeting of the Iron and Steel Institute which opened on Tuesday, Sept. 1, at Barrow-in Furness, Lancashire, Eng.:

It is 29 years since the Institute held its autumn meeting at Barrow. I have recently looked over the proceedings of that notable meeting. These seem to carry us back almost to the very beginning of cheap Bessemer steel manufacture in America, in which as usual Britain was the pioneer and taught the younger Republic. It was at that meeting your fellow-member, and Bessemer Medallist, Alexander Lyman Holley, then our engineer from the Carnegie Steel Works, read the two papers which first brought to your attention the doings of your American brethren in developing the Bessemer process you had given them.

There are several here to-day who were then present. Such was the impression made upon the meeting that after the discussion, in proposing a vote of thanks, our Nestor, Sir Lowthian Bell, as president, said "there was no doubt that in America they were doing great things in the manufacture of Bessemer steel, and their friends on the other side of the Atlantic were not averse to telling them what they did, and not only what they did, but how they did it. He thought, under the circumstances, if any member of that Institute was entitled to the thanks of the meeting it was the gentleman who had just read the last two papers."

The effect of these papers, as you know, is a matter of history. Mr. Josiah T. Smith, of Barrow, one of the greatest of your managers, and subsequently president of the Institute, characteristically said that Mr. Holley would find that, as far as Barrow was concerned, "They would try and do as well, in regard to quantity, as the United States," which struck the right note. There spoke the true Briton, who has done according to his means more than any other, the American not excepted. The record of the great little mother of nations is not equaled by any of her children, although her oldest and biggest seems to inherit his mother's indomitable spirit and the ability to work miracles. In all matters of iron and steel, however, the child has been borne upon the shoulders of the parent. If the Atlantic Ocean had been prairie land, there would have been little left in the world but the conquering old

lady and her family, all under one roof, under one flag of a self-sustaining empire under free trade with probably two hundred millions of our English-speaking race, and a home market so big as to give control of neutral markets. No question of protection or preferential tariffs then to disturb us. Besides all this we should have been able to enforce peace among nations. It would have been a case of Britain versus all the rest of the world, the world kicking the beam.

Gentlemen, unfortunately an ocean exists where we should have preferred prairies, but it is traversed in about the same time as the three thousand miles of land between Montreal or New York on the Atlantic and San Francisco and Victoria on the Pacific. Who so bold as to predict that never is our race to succeed in converting the ocean, hitherto a barrier to your extension, into the pathway to reunion of the two once united branches. Not I! My faith is unshakable that some day this will be accomplished and that instead of being two small islands here alien to the European Continent you will look across the sea to your own children in Canada and the United States, and become once more the mother member of the dominant power of the world.

Mr. Whitwell participated in the discussion at the last Barrow meeting and asked Mr. Holley to give his opinion on the "from one-half to three-quarters more product which could be got from the converter in America than we were getting in England," which Mr. Holley answered after reading his second paper. It was chiefly owing to his own invention of bottoms in reserve and removable appliances.

There was also at this historical meeting a report, a remarkable production, submitted by David Forbes, foreign secretary to the Institute, upon the progress of iron and steel industries in foreign countries. I naturally turned to see what he had to say about the United States. Several pages are given to the Pittsburg district, and what is there recorded carries me back to the days of youth apparently. In 1873 the Pennsylvania Steel Co. made 20,000 tons of steel rails. They make that amount in two weeks now. Bethlehem Iron Works were engaged in raising a loan of the enormous amount of £20,000 for the extension of their works, a paltry 100,000 dollars. Five millions would be comparatively less today. The great Cambria Iron Works in Western Pennsylvania, near Pittsburg, were credited with having made no less than 1027½ tons of ingots in the week ending September 26th, the largest quantity ever made in a week—a day's work nowadays. Two new blast furnaces were being built in Ohio, the capital of the company being all Scotch, and it was proposed to call the iron Scotch-American pig. This isn't a bad brand—either of men or iron. It is noted that the total production of pig iron in the United States in 1872 was 2,897,000 net tons, and in 1873 just about the same; to-day it is approaching 20,000,000 tons per annum. The product of steel, nearly 15,000,000 tons, is greater than the rest of the world.

The progress of Germany and Britain has also been great Britain made 643,000 tons of steel in 1874, and last year 1,826,000 tons. Germany made 362,000 tons in 1874, last year 6,394,000. In 1874 Britain made 6,054,000 tons of pig iron, Germany 1,906,000 tons. Last year they made 8,518,000 and 8,403,000 tons respectively. In 1874 the world was producing nearly 14,000,000 tons of pig iron and 280,000,000 tons of coal. Now there is being produced 41,000,000 tons of pig iron and 780,000,000 tons of coal.

Another item:—Mr. Forbes is informed that for the last seven months natural gas has been utilized in Pittsburg in one of the mills. The largest output for a furnace then known was during the week ending September 7, 1874—702½ tons, 100 tons per day. When our Lucy furnace made 100 tons in one day, the world thought the limit was surely reached. Two new Carnegie furnaces have recently averaged 650 tons each per day for months at a time.

Records are given of various enterprises which promised brilliant results, but which are already things of the past. Perhaps the most noticeable point of all is that not the slightest mention is made of the Carnegie Steel Co.—so much a thing of yesterday it is. It was making iron and building bridges and had also furnaces in operation, which were visited by the late Thomas Whitwell, but it was scarcely worth noticing, as its steel works were then only under construction. So rapidly do things grow in the new land!

You have noticed that the blast furnace product increased more than six times, and also the rail mill's product about the same. The work of a week is now done in a day, but great as is that contrast, here is one still greater. There have been made and sold without loss hundreds of thousands of tons of 4-inch steel billets at three pounds for *a penny*. Surely, gentlemen, the limit has been reached here. I think it has, and it is doubtful if ever a lower price can be reached for steel. On the contrary, there is every indication that period after period the price of steel is to become dearer owing to the lack of raw materials. To make that three pounds of steel, at least ten pounds of material were required—three pounds of coke, mined and transported sixty miles to the works, one and one-half pounds of lime, mined and transported one hundred and fifty miles, and four and one-half pounds of ironstone, mined at Lake Superior, and transported nine hundred miles to Pittsburg, being transferred twice, once from cars into the ship, and again from the ship into the railway cars. How it was done, I cannot pretend to tell you, but I know the figures are correct. But every time I repeat them I doubt their possibility. This was done during the day of depression, when everything was at the lowest. Costs are several dollars per ton higher to-day, during this period of boom in America.

Gentlemen, such is the contrast between 1874 and 1903. What is it to be twenty-nine years hence? What changes are to come? I have tried to imagine some of its features. It is scarcely possible that this country can increase its product of iron and steel materially. Let us hope that the product will not be decreased. The vital element in the matter is, as we all know, the supply of iron ore. Many of you are conversant with the situation here. I only know what I learn from others, but undoubtedly the attention of the iron and steel manufacturers should be directed to this question—Where and how can they obtain a supply of iron ore?

Nor is it a question which the manufacturer of America can safely neglect. It was because it forced itself so strongly upon us that we secured such an abundant supply of the best ore obtainable. For sixty years, I think, the United States Steel Corporation is supplied at its present rate of consumption, but sixty years is as nothing in the life of a nation. It is upon future discoveries of iron ore that the future of cheap steel manufacturing, even in America, depends. There are immense deposits in now inaccessible parts. In Utah, for instance, and in Southern California large deposits have been found, so that steel will continue to be manufactured, but it would not surprise me if its cost was very greatly advanced in the future. It seems almost miraculous that such an article as steel could be produced and sold without loss at three pounds for *a penny*. I am convinced that this is a thing of the past. It will be a question of increased cost and therefore of increased price, so that neither Britain nor America need fear that steel manufacture will be wholly lost; the world will gladly pay the increased price necessary to obtain it. During the next half century, it seems that America is to increase her output at a tremendous pace. The output of Britain will perhaps remain stationary or even increase somewhat if developments in Norway and Sweden prove satisfactory.

Gentlemen, even if this Barrow meeting should fail to rank in importance historically with the first one, I am sure that in the warmth of welcome received, in the enjoyment of the occasion and in the meeting of one with another, the records will not fail to show that 1903 compared favorably even with its epoch-making predecessor.

The creditors of the Columbia Iron Works, St. Clair, Mich., have a plan on foot for reorganization of the company and a resumption of business. It is proposed that each creditor take the amount of his claim in stock at par and that $50,000 of the $300,000 in stock shall go to the old stockholders.

The first edition of the pamphlet "Concerning Iron Making," by Elisha Walker, has been exhausted, and Fisk & Robinson, of New York and Boston, have just issued a second edition with several new illustrations of the works of the Buffalo & Susquehanna Iron Co., at Buffalo, N. Y.

D. E. WHITON MACHINE CO.'S STOCK SYSTEM.

The stock system of the D. E. Whiton Machine Co., of New London, Conn., deals with a great number of parts. The firm manufactures centering machines, lathe and drill chucks, as well as gear-cutting machinery, and a method of handling the numerous pieces in the stock room is necessarily an extensive one. The bins are laid out carefully to conform to the quantities carried in stock, and by means of a system of lettering on the vertical and horizontal lines the location of any box in a section may be denoted by doubling the letters, as A B, A D, etc. Here the boxes at the intersection of the lines A and B, A and D, are the ones indicated. These bins and sections can be laid out by blue prints to show the character of contents, the material and purpose of the same being shown with the dimensions, etc.

A B C D E F G H I J K L M N O P Q R
Green End Steel
Square and Hexagon Steel
End End Steel
Round Steel
Flat Steel
THE IRON TRADE REVIEW

FIG. 1.—ARRANGEMENT OF A STEEL RACK.

Fig. 1 represents the steel rack with the reference letters across the top and up and down each end. This is reproduced from a blue print and shows the different sizes of material in the rack, the location of each size in the rack being elsewhere denoted by the use of the two letters showing the square at the intersection of the lettered rows.

The table in Fig. 2 is from a portion of a blue print giving the sizes of round, square and hexagon steel of various sorts. The rack where the material is to be found or stored, as the case may be, is designated by the appropriate intersecting letters from the storage rack. These tables show flat as well as round, square and hexagon stock as required in the shop, the system of reference letters applying uniformly to all material. The blue prints also show the various parts which are cut from bars of the same size and thus the tables serve as a guide to the quantities which it is advisable to order at one time.

Bars are designated by coloring the ends to indicate the classification by quality of material. The use of the color scheme is common in many shops as a means of distinguishing quality, is easily acquired by a new workman, and is readily and unmistakably seen. The color scheme is shown on the blue prints as reproduced in Fig. 2.

The bins for small parts are arranged along the general lines followed by the one illustrated in Fig. 1. The set of bins for chuck jaw blanks is quite a long one, as a large assortment of these is carried in stock. The one bin calls for two blue prints of the standard page size, 16½ x 9½ inches, to show the contents properly. The vertical position of each horizontal row of bins is denoted by the letters a, b, c, d and e, and each horizontal row is divided into sections numbered 1, 2, 3, etc.; these sections being composed of all the bins of the same cubic capacity.

There is a similar blue print of bins in which are stored round steel parts, the different horizontal rows of bins being denoted in this case by the letters f, g, h, i, j and k, and each row being again divided into sections composed of bins of equal cubic capacity.

In connection with this storage system there is used a series of blue print tables for each style chuck made by the company. These tables show: first, a list of the parts; second, the quality of the steel from which the part is made; fourth, the cutting-off length, and then the weight of each piece and the cost per piece at a standard price per pound. These tables show in addition to these particulars, the bins in which the cut-off parts are stored. These bins being denoted for the various parts by the reference letter, which indicates the row of bins in which the parts may be found, and the section number, which locates the horizontal section in which the bin is placed, where the particular piece in question is stored. These blue print tables are made of uniform size, the series temporarily bound in book form for convenient reference and arranged so that other tables may be added from time to time as is found necessary.

Green End Round Steel

Size	Rack	used for
3/8	A A	Sym. B-2,2½ Wrenches.
1/2	A B	Sym. B-3, 4, 5, 6, 7½, 9, 10 Wrenches.
9/16	B A	Sym. B-2, 2½ Screws.
5/8	B B	Sym. B-3, 4, 5 Screws. F-2, Wrenches. H-9 Levers.
11/16	C A	Sym. G-12 Bolts.
3/4	G A	Sym. B-6, 7½, 9, 10, Screws. H-12 Levers. H-12 Bolts. AS-6, 7½, 9, 10½ Screws.
13/16	C B	Sym. H-15 Levers.
7/8	F A	Sym. H-15, 18, 21, 24, Bolts. H-18, 21, 24, Levers. V New Ind. 6, 7½ Wrenches.
15/16	H A	Sym. F-3 Bushings G-10½ Wrenches. S-10½ Wrenches. V New Ind. 6 Screws. V New Ind. 9,10,12 Wrenches.
1	D A	Sym. G-15 Wrenches. S 15 Wrenches. V New Ind. 14 Wrenches.
1 1/16	D B	Sym. V-New Ind. 7½ Screws.
1 1/8	I A	Sym. V-New Ind. 15, 16, 18, 20, 21, 22, 24, 25, 28, 30, 32 Wrenches V Hvy. Ind. 14, 16, Wrenches.
1 3/16	E B	
1 1/4	J A	Sym. F-4½ Bushings. V New Ind. 9, 10, 12, 14 Screws. V Hvy Ind. 18, 20, 22, 24, 28, 32, Wrenches.
1 5/16	E A	Sym. F-6 Bushings.
1 1/2	K A	Sym. V. New Ind. 15, 16, 18, 20, 21, 22, 24, 26, 28, 30, 32, Screws. V Hvy. Ind. 16 to 32 Screws.
1 13/16	I C	
1 7/8	J C	
1 15/16	I C	
2	J C	
2 1/8	K C	
2 1/8	K C	

THE IRON TRADE REVIEW

FIG. 2.—PART OF BLUE PRINT INDEX TO STEEL RACK.

The system, when followed out for a list of standard manufacturing parts, and when the purchasing department, the cost acounting department, superintendent, steel storage and cutting-off departments are supplied with the books in duplicate, works very nicely. It is found equally convenient in making out inventories and maintaining a sufficient supply of cut up parts constantly on hand.

LAKE SUPERIOR IRON MINES.

There is renewed activity in explorations in the easterly part of T 59 R 14, northeast from the Duluth & Iron Range road's crossing of the Mesabi range. In Section 12 land of the Oneota Mining Co. is under exploration by H. E. Smith, of Duluth. He has put a hole down 168 feet and is in slate. In the northwest part of the same section others are starting to drill. In Section 1 the Lewis Iron & Exploration Co. will drill. In the sw corner of Section 15 explorations have ceased. In the se part of the same section, reports from which have been generally supposed to indicate a large body of good ore, no clean ore has yet been found, and the outlook is not so good now as it has been previously. In Section 28 the Delta Iron Co. has stopped work, after having been drilling for months in mixed ore and hard taconite. Near Mesabi Station drills are still working, but it is impossible to tell what they have found. Considerably to the northeast of other work mentioned R. Whiteside has been doing a little test pitting on lands of the Mesabi Iron Co. but not in any real expectation of finding ore in suitable quantity or quality. These lands are not regarded with the utmost favor.

Exploration is begun on the Turney lands, in Section 24 T 58 R 18, and a drill is to be put to work.

Total shipments from Corrigan, McKinney & Co. mines of the Mesabi range this year will amount to about 1,500,000 tons, or some 500,000 tons less than was anticipated at the commencement of the season. So far these mines have sent down 1,000,000 tons, of which the Stevenson has produced about 750,000 tons. The Commodore, which was expected to make a large shipment, is doing little more than a minimum, and the Jordan has reduced its force. There is a disposition on the part of mine operators generally to go slow and await the future.

Milling at the new open pit was started at Adams mine last week. This pit is from 40 to 65 feet deep and 200,000 cubic yards have been removed from surface since last November, when the mining company began stripping. The surface is very hard, chiefly a cement hardpan sprinkled full of granite boulders, and has tried the machinery used in moving it. This pit is 500 feet from No. 4 shaft and all ore milled will be trammed to that shaft by electric locomotives. Stripping is to continue the rest of this year. Adams-Spruce output this year will be the largest ever achieved by an underground mine, for practically all of it comes this year from underground. Last year the mine made an output of more than 1,785,000 tons from shafts.

At Section 6 T 58 R 15 about 800,000 tons of high grade ore is said to have been proved by the Minnesota Iron Co. in explorations on the Daniels-Spellman lands. Adjoining this both east and west drills are working and the productive width of the range may be increased at this point.

At the Burt open pit, near Hibbing, they are now moving 3,500 yards of stripping each day and the mining company is taking out from 6,000 to 8,000 tons a day. This pit was started only last summer, and the work since then has been most instructive as an instance of what can be done when necessary. The open pit is now about 500 feet wide and nearly 1,500 feet long, and is still growing. The company shovels are mining on the south side of the pit, while stripping continues on the north.

Stripping has ceased at the Crosby mine in Section 32 T 57 R 22, and but little will be done there the rest of this year. This property has not proved up as expected on earlier explorations; indeed, there is little more ore shown there now than when it was taken by the mining company. On this property the operating company takes the mine at a royalty of 27 cents a ton on all ore shown up, ore being defined as anything that runs above 56 percent iron, without regard to phosphorus. The mine is supposed to contain, as far as shown, about 1,500,000 tons.

Drill work on the western Mesabi is not so active as a few weeks or months ago, and may continue quiet for some time. Several operators have removed for the time being a considerable share of their machines.

New mining and exploration companies have been organized for Mesabi range work as follows within the past few days: Lewis Iron & Exploration Co., to explore on contract and private account, capital, $25,000; incorporators, Messrs. John, Frank and Edward Kleffman. Blue Ore Mining Co., capital $50,000; incorporators merely temporary. Alpha Mining Co., capital $300,000; incorporators, P. C. Schmidt, H. B. Fryberger, O. Mitchell, T. W. Wahl. Rogers Mining Co., capital $300,000; incorporators merely temporary. Mesaba Cliffs Mining Co., capital $300,000; incorporators, W. G. Crosby, E. B. Gridley, T. A. Gall.

Both the Cass and Kanawha mines at Biwabik have reduced forces and will mine but slowly for the present. They are both managed from the office of Joseph Sellwood, of Duluth.

Car shortage is felt on all ranges, due to slow delivery of ore by vessels at lower lake ports, they claim. It is particularly urgent on the Menominee range and somewhat less so on the Mesabi. Menominee transportation affairs are liable to be seriously complicated by the advent of the Wisconsin and Michigan road, the latest factor in ore hauling there.

On Felsh mountain, at the Calumet property, a fine lens of high grade ore has been cut.

New "A" shaft at Norrie mine is to have a steel shaft house, though not so elaborate as those at Ely, where more sorting is required. This shaft is 6 by 23 feet inside dimensions and is sunk at an incline of 58 degrees. It contains two skip compartments, each 6 by 6 feet, one cage way, same size, and a ladder, pipe and counterweight way 4 by 6. This shaft is about 900 feet deep and is lined throughout with steel sets and wood lath, except for the upper 20 feet to ledge, which is timbered in the customary way. This shaft is in the footwall and will take the place of several that are liable to come down. The shaft is one of the largest in the Lake iron region, being exceeded by one at Norrie and the new vertical shaft at Chapin.

Officials of the Oliver Iron Mining Co. recently visited the Michigan mine, Menominee range. It is understood that what ore is standing in the pillars on the third level, about 10,000 tons, will be mined. Some more crosscutting will be done, and if the showing is not favorable, the mine will be abandoned. The Michigan is said to have been very disappointing to the company.

Water will be pumped out of the Gibson mine on the Marquette range, and a crosscut driven where the water was struck. The total output of this mine is 16,357 tons. It has not been open since 1887.

Work is still in progress at the Armenia on the Menominee range, although there has been a general expectation of a shut down. Showings made by the drill are said to be good, and it is believed that there is a fair prospect of the Armenia having a prosperous existence. The old shaft will in time be abandoned, as it is too close to the ore body to be safe.

The Hanging Rock Region.

Ironton, O., Aug. 30.—The Portsmouth Steel Co.'s plant resumed operations last week after a shut-down of five weeks.

Bloom Furnace, in Jackson County, is making from 10 to 14 tons of charcoal iron daily.

Hecla furnace of the Hecla Charcoal Iron Co. has been put in blast after a suspension of some weeks. The company is securing 3,000 bushels of charcoal and 50 tons of native ore daily.

The steel plant and rod mill of the Ashland Steel Co., at Ashland, Ky., resumed Aug. 27 after a brief suspension necessitated by shortage of material.

The plate department of the Kelly Nail & Iron Co. plant resumed Aug. 26 and the cut-nail department on Aug. 27. The prospects are good for a steady run.

The Portsmouth Foundry & Machine Co. has purchased adjoining property for the purpose of enlarging its plant and making room for additional improvements.

The new Wilson Foundry & Machine Works at Kanawha Falls, W. Va., is now in operation. The plant is equipped for foundry and repair work and will make a specialty of mine cars and mine tipples. The company has already a number of contracts.

W. L. Simonton, manager of rolling mills for the Republic Iron & Steel Co., in answer to a letter from the Merchants' Association of Ironton, O., states that the company has not abandoned the Eagle rolling mill at that place and will operate it as soon as business warrants.

New Plant of the Cleveland Pneumatic Tool Co.

The new plant of the Cleveland Pneumatic Tool Co., of Cleveland, is in marked contrast with the old quarters on Frankfort St., in the same city. There the factory and its surroundings had anything but the light not to say cheering conditions that accompany high manufacturing efficiency and was crippled to just that extent. The present shop at Second and Hawthorne Aves. is better located and in equipment is far ahead of its predecessor. The product is not confined to

FIG. 1.—PLANT OF THE CLEVELAND PNEUMATIC TOOL CO.

pneumatic hammers; in fact, the manufacture of drills may be considered the starting point of the business. Hammers and riveters now form the staple, though drills, valve grinders, etc., are also made.

Riveters and hammers driven by compressed air are among the most portable of tools. There is no vague fear of a stray leak from a too live wire or of the heat of a steam pipe. Wires may be insulated and electric current by either rotary or solenoid mechanism drive portable riveters and hammers. Hose, metallic and otherwise, of various types, can convey steam pressure to portable tools effectively. Neither of these, however, interferes with the domain of air under compression.

So evidently convenient and ingenious a solution to the problem of portable pneumatic equipment is the simple length of hose and the chisel or rivet-set holder at the outer end, that little regard is given to the compressor itself. Without the machine to send out the air with its stored energy, the inventors of pneumatic apparatus would make small headway; and this was the condition of affairs not many years ago. Hammers were made of the long-stroke variety some 20 years ago but the rest of the equipment was not then ready. The long-stroke hammer made by the Cleveland Pneumatic Tool Co. is manufactured under the patents of Charles B. Richards. In general, it consists of a barrel having a socket at one end for the insertion of the rivet set or other working tool, a handle at the other end of the barrel, a plunger reciprocating in the barrel and striking the shank of the working tool, and a valve controlling the admission and exhaust of compressed air at both ends of the plunger cylinder in the barrel. The movement of the valve, it may here be mentioned, is obtained in the one direction by compressed air under the normal pressure. The valve is actuated in the other direction by air compressed beyond normal pressure by the returning plunger which cushions on a supply of air between the exposed end of the valve and the plunger. The barrel as well as the plunger and its cylinder is worked out of the solid steel and this item will suggest to the mechanic not otherwise familiar with the hammer something of the intricacy of the work about such a hand-operated tool. The process demands exact jig making, close grinding and the drilling is quite an undertaking. Systematic superintendence joined to excellent facilities with men and machines give the task an appearance of ease.

The exterior of the plant is shown in Fig. 1. A number of hammers, long and short stroke, single handed and with the two-hand attachment, air-driven breast drill, etc., are seen in Fig. 2. This view also shows the individual benches, permitting the workman to get closer to the light as he needs demand and also having other advantages in bringing out the special enterprise and system of the vise hand. The row of lathes in Fig. 3 presents no more of interest than is found in many manufacturing departments, but in Fig. 4 is seen the valve chamber and the drill jigs for this job. Perched on the top of the second jig from the left is a valve chamber as it came ready for the drill press. The larger cylinders on the table are the jigs and in front of them are jig discs for locating the holes in the ends of the valve chamber. On the right are valve chambers in various positions to illustrate the many passages at different angles cut by the drill. These holes and slots must match closely and the openings must not only agree with each other but the holes in the neighboring pieces to which they are to communicate require to be accurately in line. When the holes are drilled the chamber is hardened. A steel sleeve is shrunk upon the entire length with the aid of a gas furnace and then the valve chamber is ground inside and out as shown in Fig. 5.

The holes in the pieces illustrated in Fig. 4 are not deep but the barrel of the hammers is quite the opposite of this. One of these calls for a hole 3-16x13½ inches. The operation of cutting out this cavity is shown in Fig. 6. It is easy to assume that all kinds of trouble lurk around this work but the drilling goes along smoothly and swiftly. An inquiry about the possibility of drills running awry and going in any but the straight and narrow path, brought out the fact that this was not the case. The evenness of the stock and the care with which the work is started right account for the satisfactory results in large measure. The drills, of course, have considerable claim for credit in the accuracy of the work. Drills break once in a while, perhaps, from pardonable zeal, but the pieces are readily recovered and there is no record of spoiled work at the drill press from this cause.

When the pieces are finally assembled after inspection, they go into actual service for a time. Fig. 7 shows this department. At the left is a massive block of iron and between this and the wall is a stout steel plate. The battered surface of the block and the ragged edge of the plate show the use to which the chipping hammer in the foreground is subjected. On the right is a boiler plate with rivets which have been employed for putting the long stroke riveter hrough its paces. An exhibit of some interest is seen on the top of the riveted boiler plate and in the upper right hand corner of the picture. This represents the remnant of two plates and five rivets. The rivets were forced into fitting position by the riveter and

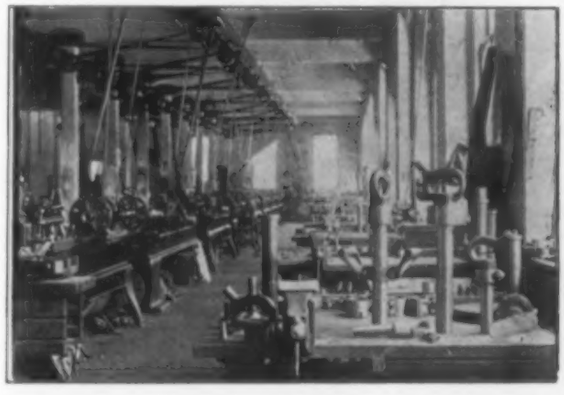


FIG. 2.—INDIVIDUAL BENCHES AND PRODUCT OF PLANT.

then the plates were cut along the line of the axes of the rivets and of course at right angles to the surface of the plates. The rivets completely filled the holes and there is but an indistinct line to show the difference between the metal of the plates and that of the rivets. Herein came the forcefulness of a comment by the superintendent, in reference to the convenience of the compressed air riveter: "We make a riveter to work inch rivets at, say, 80 pounds pressure, but what happens in many structural and boiler shops when a few 1½-inch rivets are in sight? Not the employment of another riveter. Simply a demand for more pressure and the com-

pressor man runs his machine up to 135 pounds or so and the hammer goes to work."

Granting that the hammer stands such usage, the next time even less consideration may be shown for the tool. But then the readiness with which tools may be abused is in many respects an invitation to strain the working range to the limit of endurance. The pneumatic tool proposition is anyway an

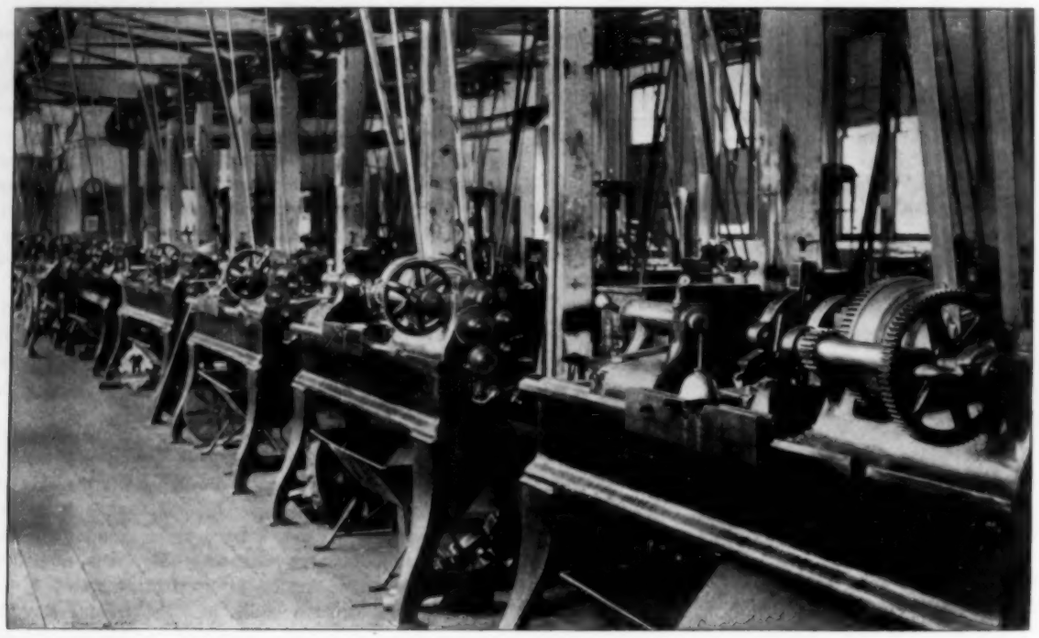


FIG. 3.—A MANUFACTURING DEPARTMENT.

interesting one and the manufacture of a sturdy and effective device a matter of much mechanical ingenuity and enterprise.

The design of the tool so that the air shall be used economically is in line with the manufacturing accuracy which means careful fitting of plunger and valve to their respective cylinders. These and other requirements that are being fully

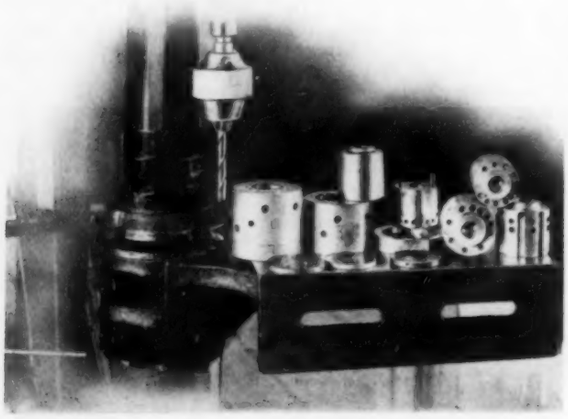


FIG. 4.—THE VALVE CHAMBER AND JIGS.

met add interest to a visit to the Cleveland Pneumatic Tool Co.'s new plant.

The Kentucky Gear & Machine Co., Louisville, Ky., recently incorporated, has purchased the interests of the G. Binder Machine Co. and controls patent rights on a gear cutting machine and elevators. It does not now contemplate the building of a larger plant, but may, within the next 12 months, increase its space considerably, as the present plant is somewhat crowded.

The new furnace of the Cleveland Furnace Co. is now making about 200 tons of Bessemer iron daily. On account of inability to obtain enough cars, no attempt to increase the output has been made.

Charcoal Iron Industry of the Upper Peninsula of Michigan.

One of the most valuable and interesting papers read before the recent meeting of the Lake Superior Mining Institute was that by President Wm. G. Mather, of the Cleveland-Cliffs Iron Co., on the Charcoal Iron Industry of the Upper Peninsula of Michigan. The address was elaborately illustrated with the assistance of the stereopticon. Mr. Mather had collected a large number of photographs of ruins of old furnaces once prominent in the history of the charcoal iron industry. He also threw upon the screen many other pictures such as those illustrating the historic stump at Jackson mine under which the first ore was found, blast furnaces in Lower Michigan,

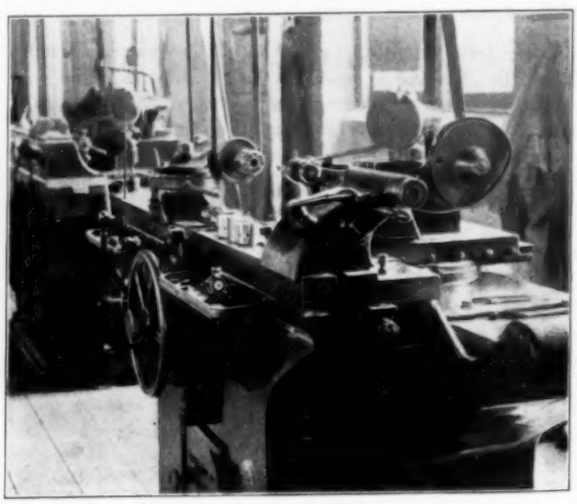


FIG. 5.—GRINDING THE VALVE CHAMBER.

scenes in the forests where cordwood is being chopped and seasoned, old and ruined batteries of kilns, views of vessels and docks in Marquette harbor in the sixties, ancient and modern types of ore and pig carrying vessels, and last of all, a fine picture of Peter White, who has witnessed and been an active and influential figure in all this development from 1849 to the present. When Mr. White's familiar face was seen there was a hearty round of applause. Mr. Mather's paper was as follows:

Mr. Mather's Paper.

I am not attempting in this brief paper to give an exhaustive history of the charcoal iron industry of the Upper Peninsula

of the State of Michigan, neither have I had time to so examine the authorities as to make in this sketch a record which is intended to be historically correct. In other words, I preface my paper by saying that it is only intended to briefly set before the Institute a few points and statistics of the history of the iron industry of Michigan, illustrated by some pictures of the furnaces, both new and old.

If we go back to the census of 1840, we will find that the State of Michigan is there credited with fifteen so-called blast furnaces, but doubtless most of these plants were little more than forges or bloomeries, and if we also pass by the Jackson Mining Co.'s forge at Carp River, commenced in the latter part of 1847, and finished in the early part of 1848, and the Marquette Iron Co.'s forge at Marquette, put in operation in 1850, and the Collins Iron Co.'s forge at Dead River, about three miles northwest of Marquette, finished in 1855, and one or two other small forges, we are brought immediately to the first regular blast furnace built in Michigan, namely, that belonging to the Pioneer Iron Co. at the present site of the city

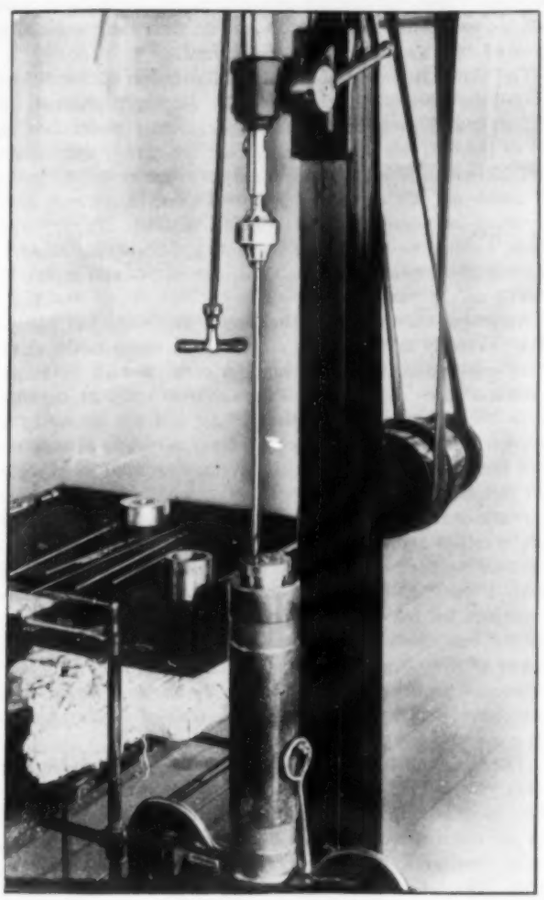


FIG. 6.—DRILLING A DEEP HOLE.

of Negaunee. This was commenced in June, 1857, and finished in February, 1858, and another stack added in the same year. Pioneer furnace No. 1 was put in blast April 18, 1858, and Pioneer furnace No. 2 May 20, 1859. They burned down and were rebuilt in 1877 and since that time were regularly active until June, 1893, in which year the last iron was made in this old historic plant. The same company continued its operations in new furnaces, namely, the Pioneer furnace at Gladstone, put in operation April 16, 1896, and Pioneer furnace No. 2 at Marquette, put into blast April 15, 1903, and is now also operating the Carp furnace at Marquette, which was built in 1873.

Increase of Production.

The growth of the product of the whole State of Michigan in pig iron by decades is as follows:

1858	1,629	gross tons
1860	5,660	"
1870	49,298	"
1880	137,879	"
1890	230,769	"
1900	163,712	"
1902	155,213	"

The high water mark of the State was probably reached in 1890, when the product was 230,769 gross tons, although it looks now as if in 1903 this would be slightly exceeded.

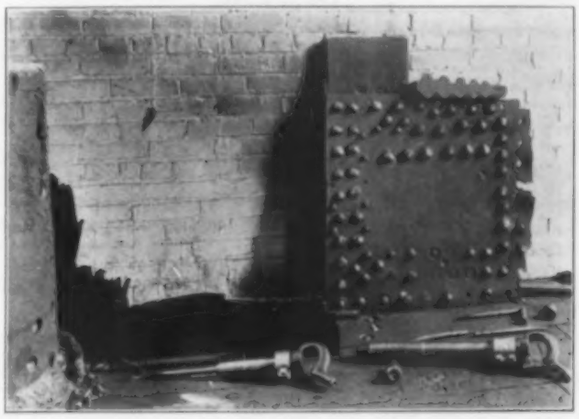


FIG. 7.—THE TEST OF ACTUAL SERVICE.

Charcoal is not of course holding its own with coke iron. It cannot be produced as cheaply and the demand for its better quality at the necessarily higher price that must be asked for it, is limited. The following table illustrates this declining relative position of charcoal iron very clearly.

Percentage of Charcoal Iron to Total Production in United States.

Year.	Percentage.	Gross Tons Charcoal Iron.	Total Gross Tons All Kinds Pig Iron.
1810	100.	53,908	53,908
1830	100.	165,000	165,000
1840	91.	286,903	315,000
1850	59.	333,205	564,775
1860	30.3	278,331	919,770
1870	19.5	365,000	1,865,000
1880	12.5	537,558	4,295,414
1890	6.9	628,143	10,307,028
1900	2.5	339,874	13,789,242
1902	2.1	378,504	17,821,307

It will be noticed that in 1830 the percentage in the United States of charcoal iron to coke was 100 percent, in 1860 30 percent, in 1890 6.9 percent, and in 1902 2.1 percent. The year of the greatest charcoal iron production in the United States was in 1890, namely 628,145 gross tons, since which time it had dwindled to 222,422 tons in 1894. The year showing the largest production after this is 1902, namely 378,504 tons.

Michigan's best year was also 1890, namely 230,769, or 32.7 percent of the total production of charcoal iron in the United States. Michigan has been growing in importance relative to the total production, as will appear from the table herewith. This shows that whereas in 1880 Michigan's proportion was a little over 25 percent, in 1902 it was 41 percent. The Upper

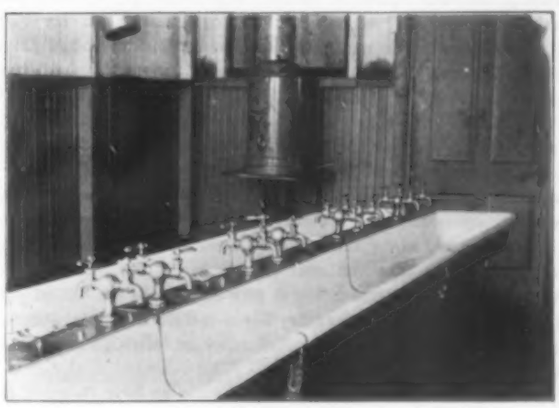


FIG. 8.—ONE OF THE WASH ROOMS.

Peninsula as compared with the whole State has increased from 35 percent in 1880 to 51 percent in 1902, and an estimate of 54 percent in 1903. Thus we see that while Michigan is constantly

taking a more prominent position in the charcoal iron production of the country, the Upper Peninsula of Michigan is itself making like progress and producing more and more of the charcoal iron of the State. The table follows:

Statement of Comparative Production of Charcoal Pig Iron in United States.

Year.	Upper Peninsula of Mich.	Percentage of Mich. product.	Entire state of Michigan.	Percentage of total production	Total production of U. S.
1850 [1858]	1,629				333,205
1860	5,660				278,331
1870	49,298	63.	77,536	21.5	365,000
1880	48,523	35.	137,879	25.5	537,558
1890	55,479	24.	230,769	38.2	628,145
1900	72,940	44.	163,712	48.	339,874
1902	80,451	51.	155,212	41.	378,504
1903 [Est.]	130,742	54.	239,758	[Est.]	

It does not seem unnatural that Michigan should be the charcoal iron producing section of the United States, owing to its vast forests of hard wood being in close proximity to its iron ores, and the State has been the largest producer of any in the Union, commencing with the year 1873, Ohio having been in 1872 the first producer, with 95,672 net tons, as against Michigan's product of 86,840 net tons.

Although the production of charcoal iron in the country as a whole has declined since its high water mark in 1890, and will in the future still further decline rather than increase, yet Michigan, and particularly the Upper Peninsula, is likely to hold its own at least during the next ten years. I base this opinion upon the fact that the largest producers in the State have of recent years very greatly strengthened themselves by acquisition of large solid blocks of hardwood timber lands and by the construction of their own charcoal making plants, thus putting themselves in a position of running more steadily at a higher rate of production than they could in the past, when they had to depend upon more uncertain sources of fuel supply.

The only country in the world which really holds its own in charcoal iron production is Sweden, now the largest producer. Its record for the last three years of which we have published reports is as follows:

1899 .....497,727 metric tons [2204 lbs.]
1900 .....526,868 "
1901 .....528,375 "

Sweden is thus now the largest producer of charcoal iron, and as its iron industry depends entirely upon this kind of fuel, of which there is still a very large quantity remaining in that country, it will doubtless continue to remain the first producing charcoal iron country in the world. Sweden, however, does not depend to such an extent as we do in this country upon marketing its charcoal iron for castings, but, on the contrary, the charcoal iron makers there are manufacturing a largely increasing percentage of their product into high quality steel.

One cannot help being struck with the influence of charcoal iron production upon the forests of a country. For example, assuming that it has required 2½ cords of wood for every ton of charcoal iron made, we find for the product of Michigan up to the end of 1902, namely, 4,631,475 tons (gross) of charcoal iron, there was used 11,578,688 cords of wood, and if we assume that on the average there has been cut 35 cords to the acre, there will have been cut over for this purpose alone 330,820 acres of solid woodland. I do not think 2½ cords to the ton is far out of the way, as in all probability the average number of bushels to the cord has not much exceeded forty, and this would allow 100 bushels of charcoal to the ton of iron. At the present time the average number of bushels consumed per ton of iron in this State is probably about 90, but in years gone by the amount necessary for a ton of iron was generally in excess of 100 bushels. A bushel in Michigan equals 20 pounds.

In this connection it is also interesting to bear in mind that the amount of iron ore (most of which came from the State) used in making this total product of Michigan charcoal iron, calculating the yield at 54 percent from the ore used, amounts to 8,568,229 tons.

The statistics for the production of the furnaces of the Upper Peninsula of Michigan are very incomplete, but by averaging the various sources of information, I assume that up to the close of 1902 the Upper Peninsula had probably produced about 2,000,000 tons of charcoal pig iron. As an instance of the difficulty of getting any reliable figures on this subject, would say that taking the figures from the annual statistical reports of the American Iron and Steel Association from 1872 to 1902, inclusive, and Mr. A. P. Swineford's History of the Lake Superior District (1876) for the figures up to 1872, I find the grand total of the production of Michigan to be 4,631,475 (which is the figure I have used above in the calculation of cords of wood consumed and tons of ore used), but in endeavoring to find, however, what has been the production of each individual furnace, I have as far as possible gotten the figures from the furnaces themselves, and that failing, supplemented them by the publications of the mineral statistics of the State of Michigan and the Journal of the United States Association of the Charcoal Iron Workers for February, 1883, and adding the totals to the make of all the furnaces compiled in this manner, we find the grand total for the State is 4,200,098, or something like 431,000 tons less than the combined figures of Mr. Swank and Mr. Swineford.

The above is simply given as an illustration of the difficulty of getting accurate statistics of the Michigan charcoal iron industry, and therefore it must be distinctly understood that all of these figures of product of iron are merely approximate, and likewise the calculation based on them as to the amount of wood and ore consumed. Nevertheless, in spite of the inaccuracy of these figures, these calculations are sufficiently close, I think, to make some interesting calculations relative to the relationship of the industry to the timber and mineral interests of the State.

Assuming therefore that the Upper Peninsula has produced approximately 2,000,000 tons of charcoal iron up to the close of 1902, we find that there have been consumed in its furnaces 5,000,000 cords of wood, and that 166,666 acres of woodlands have been cut over. For the foregoing I am assuming that 2½ cords of wood have been used for each ton of iron made and that 30 cords has been the average secured from an acre for the yield of the Upper Peninsula. For the Lower Peninsula I would estimate an average yield in the past of 40 cords to the acre, as against 30 in the Upper Peninsula, making the average 35 cords for the State. At the present time, however, I would estimate 2¼ cords of wood per ton of iron, and therefore for the estimated production in 1903 in the State of 239,758 tons there will be consumed 543,552 tons of ore, 539,505 cords of wood, and 15,414 acres of woodlands, and for the estimated production of the Upper Peninsula, namely, 130,742 tons, there will be consumed 241,392 tons of ore, 293,562 cords of wood and 9,785 acres of land cut over.

The production of the Upper Peninsula will be increased next year by the fact that the new furnace at Marquette will then have been in continuous blast during the whole year, while in our calculations for 1903, she has only been producing for a brief time. It is therefore perfectly safe to say that the charcoal furnaces of the Upper Peninsula are clearing off 10,000 acres of woodlands per annum, or an average of about 30 acres per day, for 365 days in the year. This is clearing off a nice farm every day, and must aid very materially the process of adding to the population of the Upper Peninsula, the consummation of which is very desirable, as at present the whole population of the Upper Peninsula is approximately only three hundred thousand.

Extent of Timberlands.

I have been trying to get some reliable information regarding the number of acres of timberlands still uncut in the Upper Peninsula, but have been unsuccessful. The total acreage of the State (including the lakes) is set down as 36,704,000 acres, of which 10,419,840 is credited to the Upper Peninsula. According to the 12th United States census (1900) 67 percent of the State is woodland, namely, something over 24,000,000 acres. This, however, does not help us much, as it does not differentiate between soft and hard woods. Volume 13, No. 9, of the 10th census of the United States, published in 1882 and 1883, page 551, on "Forestry," reads: "The estimated amount of 124,500,000 cords of hardwood is distributed over some 10,000,000 acres in the Upper Peninsula." Estimating

that the furnaces have been using 300,000 cords of wood a year since 1880, the 23 years to the close of 1903 would measure a consumption of 6,900,000 cords of wood, or say 7,000,000 cords, which, if there were no other cause of consumption, would leave a balance of about 11,750,000 cords. It is, however, impossible from such meagre data to make any calculations whatever as to the number of cords of hardwood now existing in the State, as of course a vast amount of hardwood is used besides that which is consumed for charcoal. The fact remains, however, that in the Upper Peninsula today the charcoal furnaces are doubtless consuming the wood cut from over 10,000 acres of woodland per annum, and 50 years' consumption at this rate would make 500,000 acres, which is not necessarily startling, when we consider the vast acreage of woodland doubtless still existing in the 10,000,000 acres of the Upper Peninsula, and the clearing of this land for the procuring of charcoal is today an unmixed boon, in my opinion, to the Upper Peninsula, as it gives the settler a chance to buy cheap land in a section of the country which is now generally conceded to be unsurpassed for grazing and to possess very great advantages for many kinds of agriculture.

Furthermore, to the owner of comparatively small tracts of woodland, desirous of clearing it for farming, the charcoal iron industry as at present established on the soundest kind of financial basis, enables him to always find a market for his cordwood at remunerative prices, whereas years ago the settler was obliged to cut down and burn up his fine logs and cordwood, in order to get them out of the way, receiving absolutely no remuneration, either for his labor or material.

An interesting feature which should not be overlooked is the increase in the saving of the by-products of the carbonization of wood of late years. To give one an idea of the size of this industry, I have secured some figures showing the amount of wood alcohol which is now being made in this State. In 1902 I estimate that there were 982,308 gallons of wood alcohol made, and during the first six months of 1903, 683,747 gallons, or at the rate of 1,367,494 gallons for the whole year, which at 60 cents a gallon, the 1902 price, equals $820,496.40. The increase, however, in the production of wood alcohol has been so great, not only in this State but also in the whole country, (although the greatest increase has been in the State of Michigan) that the price during this year has already declined 25 percent, and if this decline should continue any further, it will result in the shutting down of many of the alcohol factories.

The following table which is admittedly incorrect, gives approximately, the total production of pig iron by furnaces up to the end of 1902:

Upper Peninsula.	Tons.
Pioneer Furnaces	637,299
Collins Furnace	41,977
Northern Furnace	15,059
Bancroft Furnace	55,608
Morgan Furnace	56,563
Champion Furnace	31,048
Michigan Furnace	40,511
Greenwood Furnace	40,202
Fayette Furnace	229,288
Munising Furnace	28,312
Bay Furnace, Onota	50,706
Deer Lake Furnace	93,579
Marquette & Pacific R. M. Co.	38,859
Grace Furnace	11,346
Carp River Furnace	83,500
Excelsior [Peat] Furnace	68,634
Menominee Furnace	59,553
Escanaba Furnace	8,048
Martel Furnace	58,349
Vulcan Furnace	73,829
Gogebic Furnace	3,700
Manistique Furnace	150,904
Florence Furnace	5,400
Total Upper Peninsula	1,893,154
Lower Peninsula.	
Michigan Central Iron Co.	42,998
Bangor Furnace Co.	126,957
Peninsula Iron Co.	217,632
Eureka Furnace	185,183
Leland Furnace	10,082
Frankfort Furnace	13,917
Elk Rapids Furnace	444,544
Detroit & L. S. Iron Mfg. Co.	78,691
Union Iron Co.	129,503
Spring Lake Iron Co.	405,934
Detroit Iron Furnace Co.	133,086
Gaylord Iron Co.	97,262
Antrim Iron Co.	369,903
Pine Lake Iron Co.	40,252
Total Lower Peninsula	2,306,944
Total for State of Michigan	4,200,098

This shows that the largest production in the Upper Peninsula has been reached by the Pioneer furnaces, commencing with the year 1858, and including the make of the company's more recently built plants at Gladstone and Marquette, but not including the Carp furnace, which is now operated by the Pioneer Iron Co. The product of the Pioneer furnaces as above is calculated to be 637,299 tons. The only other two furnaces in the Upper Peninsula which have produced over 100,000 tons, are the Fayette furnaces, estimated at 229,288 tons, and the Manistique furnace, estimated at 149,845 tons.

Prices of Charcoal Iron.

With regard to the prices that have prevailed on charcoal iron, I regret to say that the same difficulty presents itself of obtaining correct figures as respects the Lake Superior product. The census reports give certain figures, and the records which we have preserved in the office of the Cleveland-Cliffs Iron Co. taken from the Pittsburg papers, also give figures running many years back, but they are unfortunately mixed up with the iron made in Ohio, New York and the South, many of which were cold blast irons, and therefore not to be used as indicating the prices of the warm blast irons of the Upper Peninsula. I have, however, an interesting letter from Mr. Solon Burt of the Peninsula Iron Co., which gives some prices which prevailed for the Peninsula Iron Co.'s iron from 1864 to 1873 inclusive, namely:

Detroit, Mich., Aug. 13, 1903.

Mr. Wm. G. Mather,
Cleveland, Ohio.

Dear Sir:—From inspection of Peninsula Iron Co.'s books, I would say that their sales would average about as follows, for years given.

1864	$70.00	Min. $60.00 Max. $76.00
1865	50.00	
1866	50.00	
1867	48.00	
1868	42.00	
1869	44.00	
1870	40.00	
1871	37.50	
1872	55.00	
1873	55.00	

In 1874 few sales were made, but it would average up about $40.00 per ton. I have not gone further than 1874, as I presume you have statistics that are quite reliable from about 1875. Previous to 1864 I have little knowledge of the charcoal iron business. As I remember, when the Morgan Iron Co. was building its furnace in 1863, they were figuring on being able to sell at $18.00 per ton. I think, however, that must have been at Marquette, as the freight down in those days was probably three or four dollars per ton. Gay and Case had pretty hard work to keep their furnace running and meet obligations. I think Gay was so hard pressed that he had to turn his iron over to the bankers to get funds. I think the same was the case with Dr. Russel here in Detroit.

Yours truly,

(Signed) SOLON BURT.

Mr. Peter White thinks that the highest price at which he ever sold any charcoal iron was in war time; for 300 tons Nos. 3, 4, and 5 "Bancroft" he received $85.00, $90.00 and $95.00 respectively for the three grades.

Since 1873, the last year for which the price was furnished by Mr. Burt, I find nothing upon which I can absolutely rely until we come to the records of the Cleveland office of the Pioneer Iron Co., commencing with 1891, which are as follows:

1891	$16.57	F. O. B. Furnace.
1892	14.97	"
1893	15.45	"
1894	13.71	"
1895	12.09	"
1896	12.12	"
1897	11.41	"
1898	10.26	"

1899	12.24	"
1900	19.78	"
1901	16.48	"
1902	17.74	"

As showing the relative values of Lake Superior charcoal iron with coke iron, the United States census figures of 1900 are interesting.

For the State of Michigan in 1880, the average price of charcoal iron was $29.25 and of all iron in Pennsylvania (mostly coke, of course) $26.08. A dofference in favor of charcoal of $3.17. For 1890, the prices were $19.58 and $17.31 respectively, a difference in favor of charcoal iron of $2.27. In 1900, the prices were respectively $16.46 and $14.98, a difference of $1.48 in favor of charcoal.

These figures, showing the decline in the relative value of charcoal iron as compared with coke iron in the United States, tell the story as to why charcoal iron does not increase in production, either relatively or absolutely.

Whereas the total production of the United States in 1860 of charcoal iron was about 278,000 tons and of coke about 919,000 tons, in 1902 charcoal was 378,000 tons and coke iron 17,821,000 tons. You see, therefore, that it is insignificant as compared with coke iron, and yet in the history of our Peninsula, it is of interest and importance incommensurate with its bulk as compared with coke iron produced in the United States. This is especially the case with us, who are intimately connected with the production of Lake Superior iron ore. The production of charcoal iron and the mining of iron ore practically grew up as twins in this district.

In June, 1845, the Jackson Mining Co. was organized at Jackson, Mich., and in the summer of the same year secured possession of the now celebrated Jackson Iron Mountain. The ore secured therefrom was tested in a forge with a charcoal fire in 1847. A forge on Carp River, near the Jackson Mountain, was finished in 1848 and the first lot of blooms made at this forge from Lake Superior iron ore was sold to the late E. B. Ward and from it was made the walking beam of the side wheel steamer "Ocean." It is true that about the same time some Lake Superior ore was shipped to the furnaces in the Shenango Valley of Pennsylvania and there tested with coke, but at the same time we Lake Superior men should not forget that much of the development of this Peninsula has been due to its iron ore coupled with its charcoal. The site of the old Jackson forge is an historic spot and worthy of being commemorated by a monument. The old charcoal furnaces whose remains now survive only to indicate the primitiveness of the industry and the energy of its promoters as late as less than 50 years ago, should be objects of interest to all who are connected with the development of the mineral interests of this county.

One can wander into wild poortions of this country today, with the feeling perhaps that but few have penetrated to that particular place before, and suddenly come upon a battery of old ruined kilns, log houses, embankments, and roadways, the latter having served the purpose of a tramway for transporting the charcoal and wood, and you are surprised to find in a trackless wild, these evidences of an old industry, which has for many years been extinct in that place, although we know that the county itself has only been settled by white men for a little over 50 years.

As one representing a company which is interested in a large degree in the manufacture of charcoal iron, I have taken pains to secure photographs of some of the old furnaces and kilns which have borne their part in the interesting development. The men who have managed these old furnaces are deserving of mention. The manufacture of charcoal iron necessarily breeds a race of men with a knowledge of the woods and with the resourcefulness which the necessity of coping with the conditions of the wilderness always produces. Without any desire to institute comparisons, I feel as if we should mention some of those individuals who have been active in the charcoal iron industry of the Upper Peninsula.

Prominent Charcoal Iron Makers.

Ariel N. Barney, and his brother-in-law, Aaron K. Olds, in July, 1847, commenced to build the Carp forge, and on the 10th day of February, 1848, made the first bar of iron in their forge in Marquette.

A. R. Harlowe superintended the erection of another forge at Marquette in 1849.

S. R. Gay made the first pig iron from Lake Superior ore at the Collins forge, experimentally transformed into a miniature blast furnace.

Peter White, who arrived at Marquette in 1849, was one of the most active in the handling and marketing of Lake Superior iron, and was financially interested in many of the forges and furnaces, particularly the Bancroft furnace.

Among other prominent men in this industry were:

Solon Burt, now with the Peninsula Iron Co., of Detroit.

Alexander Maitland, of Negaunee, long connected with the Pioneer furnaces.

Noah W. Gray, now manager of the Carp furnace.

W. H. Nelson, now manager of the Manistique furnace.

Wm. Gerhauser, for many years manager of the Union Iron Co. at Detroit, and now sales manager and secretary of the Superior Charcoal Iron Co., of Grand Rapids, Mich., which handles more charcoal iron than any other company in the world.

Frank B. Gaylord, for many years manager of the Gaylord Iron Co., of Detroit, and now in charge of the Deseronto Iron Co.'s furnaces at Deseronto, Ontario.

H. S. Pickands was a famous name in his time, connected with the Bangor, Fruitport and Onota furnaces of Munising.

Austin Farrell, who came to Lake Superior in 1895, and although not connected with the industry as long as many others, has been among the most active and intelligent in the adoption of modern blast furnace practice to the production of charcoal iron, and has also made notable progress in the development of the processes for the recovery of the by-products obtainable from the carbonization of wood.

J. C. Ford, of Spring Lake furnace.

H. H. Noble, of Elk Rapids.

I. M. Bean, Milwaukee.

Before throwing the pictures on the screen, I would like to make a few remarks in regard to the fuel supply of a modern charcoal furnace.

You must realize that to supply modern charcoal furnace plants such as are operated by the Pioneer Iron Co. requires about 650 cords of wood per day, or 216,000 cords a year, namely 7,000 acres. To do this requires the service of 650 men in the woods, to say nothing of transporting the same on the railroad. In order that this wood may make charcoal and by-products to the best advantage, it must be dry, and should therefore be seasoned for about one year. This necessitates keeping something like 200,000 cords of wood on hand in the woods all the time. It is too bulky to be loaded on cars and transported to the furnace to remain in the yard at that place for drying, as the cost of re-handling it would be altogether too great. It must therefore remain in the woods, subject to the danger of fire and adding tremendously to the anxiety and care of the manager. It is very much harder to run such a furnace than one using coke, for in the latter the manager gets his supply of fuel daily by rail, without a thought as to its production or manufacture. In modern times, although the magnitude of this fuel operation is very great, yet the manager has the advantage in most instances of better railroad facilities and organization, than did his predecessors in olden times.

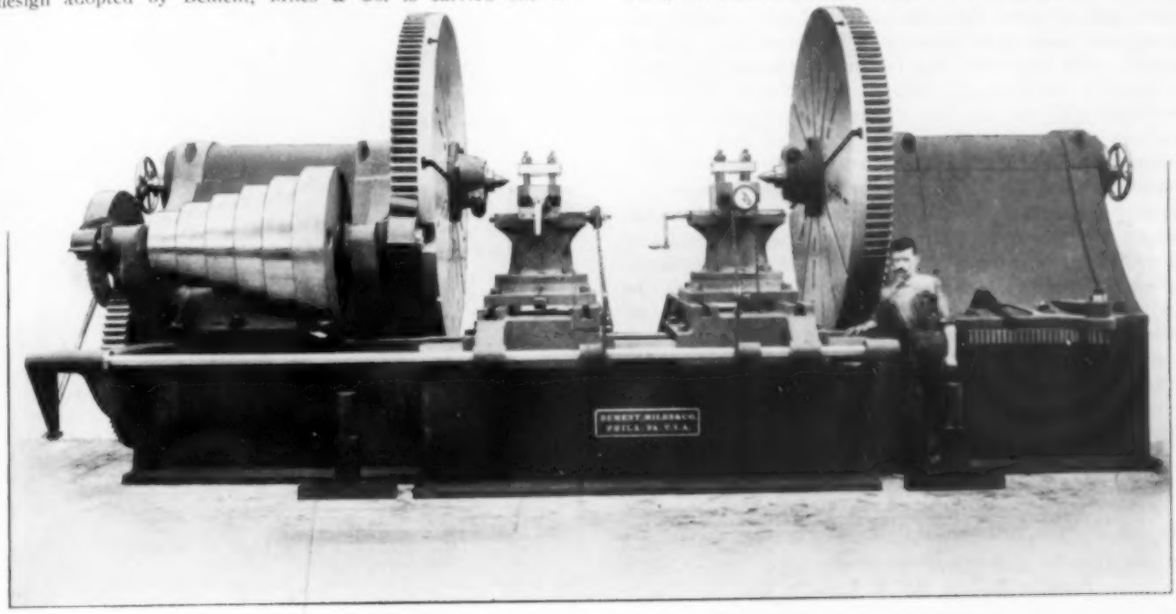
The Southwark Fdy. & Machine Co., of Philadelphia, is about to make shipment of some 2,000 tons of machinery for installation in the plant of Bolckow, Vaughn & Co., of Middlesboro, Eng., who operate one of the most extensive iron and steel plants in Great Britain. The Southwark company has made arrangements with the British engineering firm of Richardson, Westgarth & Co., Ltd., whereby the latter concern acquires the right to use the drawings of the American company for the manufacture in Great Britain of the large Southwark blowing engines.

A workman who sustained injuries through working a circular saw which he had been repeatedly warned not to touch, has recovered compensation at the Wellington County Court, England, the judge holding that the man might have been dismissed for repeated acts of disobedience.

A HEAVY WORK LATHE.

A 100-inch double head driving wheel lathe built by Bement, Miles & Co., of Philadelphia, to the order of the Chicago, Milwaukee & St. Paul Railroad Co., has made a record for heavy work at high speed since its installation at the West Milwaukee shops. The lathe was specially designed for doing the heaviest class of work with the best grade of high speed tool steels, swings 100 inches over the bed and the maximum distance between the faceplates is 9 feet 1½ inches. The illustration does not show the electric drive adopted for the lathe. A 20-horsepower motor is directly in mesh with an internal gear on the largest step of the cone, the motor and cone being mounted on a bracket attached to the head of the machine and belted from there to the cone on the machine. The centers of the two cones are about eight feet apart and very little trouble has been had with the belt; a slight application of Cling Surface occasionally keeps the belt in business trim.

The motor is of direct current type and built by the Milwaukee Electric Co. It is designed for a change of speed by field control from 650 to 850 revolutions per minute. The machine is driven by a six step cone for a 7½-inch belt diameter of the largest step being 40 inches. The standard design adopted by Bement, Miles & Co. is carried out in this lathe, but with the exception that it is made very much heavier throughout, the shipping weight is 100,000 pounds as stripped in the photograph and the regular wheel lathe of this swing weighs only 63,000 pounds. A cut 5-16-inch deep has been taken across the entire face of a pair of 84-inch tires in one hour and three minutes and the fourth pair of wheels has been in the lathe for a ten-hour day's work. Several pairs of wheels have been finished, including the time required for setting up the work, in 2 hours and 30 minutes and 2 hours and 40 minutes.



100-INCH, DOUBLE HEAD, DRIVING WHEEL LATHE.

The plant of the Taunton (Mass.) Iron Works has been purchased from J. F. Montgomery, representing the William H. Phillips estate, by the White-Warner Co., which assumed control, uniting its business with that of the acquired company, making one of the largest stove manufactories in New England. The new owners will enlarge the plant as soon as practicable. The site of the old White-Warner Co. plant, which was recently destroyed by fire, will not be used by the company now operating the Taunton Iron Works.

The Reed & Prince Mfg. Co., Worcester, Mass., is now occupying its new shops. The buildings are all of the heaviest mill construction, four stories. The main section has a frontage of 250 feet and a depth of 50 feet, and in the rear are three large wings. The company manufactures wood screws and machine screws. The business was started 15 years ago and is developing very rapidly.

AMERICAN LOCOMOTIVE CO.'S REPORT.

The annual report of the American Locomotive Co. for the year ended June 30 shows remarkable evidence of prosperity. In comparison with the previous 12½ months of the company's existence gross earnings increased from $26,398,000 to $33,105,000, or over 25 percent. Operating expenses increased 20 percent, and the net earnings rose from $3,107,177 to $5,053,410, or almost 63 percent. The surplus after most liberal charges amounted to 7.65 percent on the common stock.

Following are the figures for the year, with comparisons with the previous twelve and one-half months:

	1903. (12 mos.)	1902. (12½ mos.)	Inc.
Gross earn.	$33,105,725	$26,398,394	$6,707,331
Expenses	28,052,315	23,291,217	4,761,098
Net	$ 5,053,410	$ 3,107,177	$1,946,233
Int., bills payable, etc.	248,157	105,865	142,292
Balance	$ 4,805,253	$ 3,001,312	$1,803,941
Pfd. dividends	1,750,000	1,750,000	.....
Surplus	$ 3,055,253	$ 1,251,312	$1,803,941
Additions to property	1,142,932	1,027,077	115,855
Surplus	$ 1,912,321	$ 224,235	$1,688,086
Prev. surplus	$ 224,235	$	$ 224,235
Profit and loss surplus	$ 2,136,556	$ 224,235	$1,912,321

The general balance sheet as of June 30, 1903, compares as follows:

Assets—	1903.	1902.
Cost of property	$45,672,860	$45,482,293
Am. Loco. pfd. stock	900,000	900,000
Richmond Loco. and Machine Works consols	118,000	118,000
Sundry securities	6,483	37,526
Cash	1,048,132	1,553,855
Accounts receivable	5,576,563	4,255,721
Materials and supplies	3,108,497	2,187,566
Contract work	3,077,107	2,874,167
Accrued interest	16,846	.....
Am. Locomotive common and prefer'd stock in trust	200,000	200,000
Totals	$60,324,488	$57,209,128
Liabilities—		
Preferred stock	$25,000,000	$25,000,000
Common stock	25,000,000	25,000,000
Bonds of constituent companies	1,512,500	1,512,500
Accounts payable	2,822,112	3,324,908
Bills payable	3,415,000	1,700,000
Unclaimed interest	820	9,985
Divs. payable July	437,500	437,500
Profit and loss, surplus	2,136,556	224,235
Totals	$60,324,488	$57,209,128

President Callaway, says in part:

"The operating expenses of the company for the year showed an increase of 20.4 percent over those of the preceding fiscal period. They included not only first cost of raw material, the direct expense of manufacture, the maintenance and betterment of property, the local and general administrative and incidental disbursements, taxes, etc., but also 20 percent written off from book value of patterns and drawings and a charge of $484,370 representing positive additions to the company's property. As was the case last year the combined disbursement for renewals, replacements, betterments and addition thus charged to the current expense account is decidedly more than would be required to be written off upon a theoretical percentage basis as depreciation. The increase in the company's gross earnings is attributable to a much larger product rather than to higher prices. The officers have avoided any advance in the selling price of engines other than such as became absolutely necessary in order to meet the higher cost of labor and raw material. The increase in expense has not been in proportion to that in earnings, inasmuch as the economics introduced during the past two years are beginning to bear fruit. In order to take advantage of the exceptional and widespread demands for new locomotives during the past two years, extensive purchases of land have been made, capacious new shops of the most modern design have been erected and equipped with the latest and most efficient machinery and tools. Old shops have been remodeled and re-equipped, with the result that the manufacturing capacity of the company has increased fully 50 percent over that of the constituent plants at the time of their consolidation into the American Locomotive Co. It is expected that the improvements authorized by the board of directors will be completed during the fiscal year now opening. During the past year the sum of $1,627,801 has been expended for additions to the company's property, which, together with the sum of $1,629,228 in the previous fiscal year, makes an aggregate expenditure of $3,256,529 thus far, all of which will be paid for out of the current income. The profit on the increased output has yielded the company a highly satisfactory return on its investment. This has been accomplished without increasing the capital account. The company now carries on its books binding contracts for a large number of locomotives for delivery as late as the summer of 1904, all of which it is confident of being able to deliver in strict accordance with its promises."

The number of stockholders of the company has increased from 128 in July, 1901, to 3,498 in July, 1903.

Franklin Rolling Mill & Foundry Co.

The rolling mill department of the Franklin Rolling Mill & Foundry Co., Franklin, Pa., was placed in operation this week for the first time. There are two mills, one 16 and the other 10-inch, for the purpose of converting old rails into shapes. The shapes are to be used in the construction of tripartite poles for trolley lines, telegraph poles, and for light tension electric lines. Small angles, channels, ovals, rounds, flats and all kinds of structural shapes will also be rolled. The rolling of shapes from rails requires a great deal of careful work in proportioning passes, etc., and in a very few instances has this been done successfully heretofore. The mill building is 120x600 feet, and the power plant contains a Hamilton Corliss engine of 1,000 h. p., and a 1,200-h. p. battery of Franklin water tube boilers. The rolling mill tables are electrically operated. The foundry which is also operated by this company was completed some time ago. The foundry building is 100x300 and contains one 5 and one 15-ton cupola and two 15-ton malleable furnaces. A bolt making department was also placed in operation some time ago. The officers of the company are: C. W. Mackey, president; O. D. Blakeley, treasurer; E. E. Hughes, secretary; Hon. Jas. W. Rowland and Gen. Charles Miller, vice-presidents, and C. V. A. Conger, superintendent. The tripartite pole is controlled by the Conger patents. S. Diescher & Sons, mechanical engineers, with offices in the Farmers' Bank Building, Pittsburg, were the engineers for the plant.

Two of the three stacks of the Wellston Iron & Steel Co., Wellston, O., are at present out of blast and will probably not resume prior to Jan. 1.

RIGGING TO TAKE UP BACK LASH IN MILLING.

BY ROBERT A. LACHMANN.

Having a great number of strips to straddle mill, they being only 8 inches thick and 24 inches long, I made up a special fixture for holding two strips at a time, using three mills to true all four edges (see Fig. 1). Having to clamp the strips by the ends only, I found it absolutely necessary to run the mills into the work from the back end (see Fig. 2). This was necessary in order to force the work to the fixture, instead of pulling it up as would be the case if the mills were started in from the front end in the usual manner.

In order to overcome the difficulty of the cutters pulling the work in, thereby causing trouble, I simply made up the rigging shown with weight attachment, which overcame the difficulty perfectly, for it is obvious that the weight compels

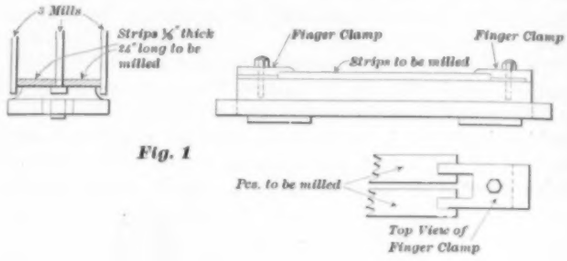


Fig. 1

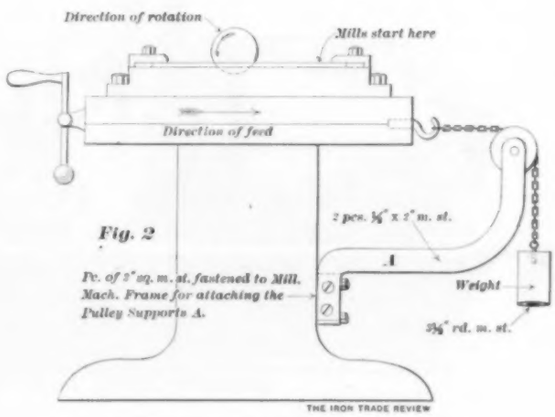

Direction of rotation
Mills start here
Direction of feed
2 pcs. ⅜" x 2" m. st.
Pc. of 2" sq. m. st. fastened to Mill. Mach. Frame for attaching the Pulley Supports A.
Wright
2¾" rd. m. st.
THE IRON TRADE REVIEW

Fig. 2

TAKING UP THE BACK LASH IN MILLING.

the table nut threads to "hang" right to the threads of the feed screw.

Its cheapness makes it an easy matter to have one at hand when occasion requires.

Lower Freights on Southern Pig Iron.

There will be a meeting of the traffic managers of the Southern railroads in Birmingham on Sept. 4, to consider the request of the pig iron interests for a reduction in the freight rates to the Ohio River crossings. It is the belief of the trade that a reduction of 50 cents a ton will be made.

The Catskill Foundry & Machine Works, Catskill, N. Y., recently incorporated, is a firm of old standing, having been in existence since the forties, under firm name of A. & B. Wiltse. Within the last ten years they have entered upon the business of cutting steel motor gears and pinions for electric street railways; and finding that the business is increasing beyond the capacity, have reorganized into a stock company, having in view an increase of capacity for output, for which definite plans have not as yet been formulated.

A noteworthy feature of the September stock list of the Bourne-Fuller Co., of Cleveland, is the introduction of a code word for each size throughout the entire list of bars, sheets, structural material, etc., the innovation being calculated to save time and expense and reduce errors to the minimum.

Henry Carey is about to establish a metal working concern at Grand Rapids, Mich. He has erected a building, but it is not announced exactly what kind of metal work he will turn out.

AN OSCILLATING SLOTTING MACHINE.

The cutting of cavities in steel or any other metal for the making of dies, etc., is performed by certain well understood methods, and the workman uses chisel, drill, miller or slotter as occasion may serve. Any departure from these methods is

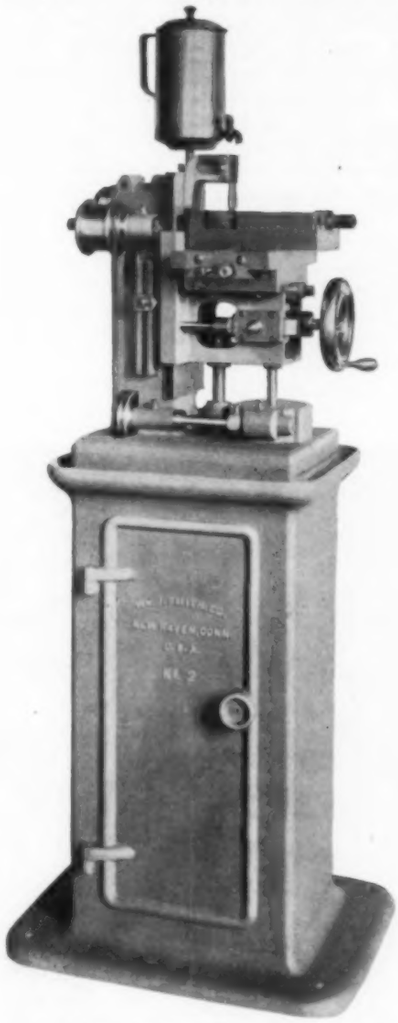


FIG. 1.—NOVEL OSCILLATING SLOTTING MACHINE.

a distinct novelty, and as the halftones below suggest there are many possibilities in the carving of metals into intricate forms. The machine shown in Fig. 1 has been patented recently by William J. Smith, of the Wm. J. Smith Co., of New Haven, Conn.

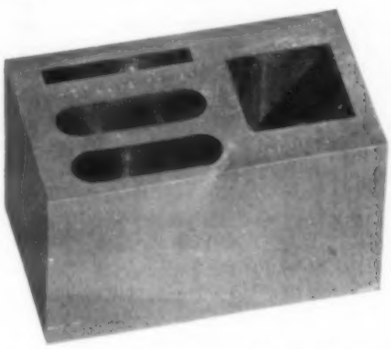


FIG. 2.—SAMPLE OF WORK DONE BY NEW MACHINE.

It is neither slotter, shaper nor miller, and for the present is known as an oscillating slotting machine. The principle is that of a rocking tool fed down into the material and scooping out the chips by the toothed end of the formed cutter. An oscillating head is split to receive the tool shank and is driven by a horizontal shaft at the top of the machine. The work is held in a vise which has adjustment in any direction and the feed to the cutter may be by hand or power as shown.

Most mechanics will find the specimen of work seen in Fig. 2 equal to the machine in interest. Here is a block of square steel, 2x1 3-16x1 3-16-inch, with sundry cleanly cut holes in it. Three of these holes go clear through the steel block and in finish and keenness of contour look like a delicately handled job with sharp broaches. But the square hole at the end changes shape when half through the chunk of steel and for the remainder of the way is hexagon, and the center opening of the three at the other end of the block goes half way only and has a semicircular bottom. The square hole is 5/8-inch across the flats; the narrow slot is 1/8x7/8-inch; the cut in the middle of the block is 5-16x1 inch, and the slot with the half round ends is 1/4x7/8-inch.

The square hole and the 1/8x7/8-inch slot in particular suggest the possibilities of the tool for irregular shapes, not to say awkward for other tools. A formed cutter can be made to suit any desired outline and worked through the metal. At this point may come up an objection. It may seem from a cursory examination that the operation is rather a nibbling at the metal than any businesslike carving of stock. The inventor claims, however, that the time taken for each cut shown by the sample illustrated in Fig. 2 is approximately three minutes. This is a rapidity of action that in the working out of dies and similar operations puts the crude chisel and file another step to the rear.

The Marvels of Battleship Construction.

The Sunday newspapers recently had a syndicate article on the building of a battleship on paper. There are, it would appear, hundreds of drawings required and each drawing is multiplied in at least a dozen blue prints. These drawings go into very minute detail and even the bolts which might be hastily assumed to be of a stock character are carefully planned and are of a kind that the common vessel of commerce does not get. We find that the bolts are not made as other bolts, and in this respect also there may be good reasons why the Government has departed from the established practice of the shops. We are told:

"The plan for a bolt—the perfect mechanical drawing, that is, whereby the Fore River Ship & Engine Co., in Massachusetts proves to the United States Government at Washington that it has read, pondered and put in practice the volume of specifications under which it signed a contract to build battleship No. 20, as the Vermont is officially known—is a good example of the exigencies under which a modern war vessel is put together. Very likely, if a visitor should pick up that bolt after it had been actually manufactured and was waiting to be used in the vessel it would seem much like any other bolt; but the Government inspector would be able to point out the differences, verify them by measuring the angles, and show the astonished visitor that not only had the bolt been cast to order for that particular vessel but, very likely, that a machine had been made to order to cast the bolt."

After learning that the bolt is "actually manufactured" one is proof against almost any of the other surprises of the article.

The Susquehanna Power Co., recently incorporated for the purpose of utilizing the water power of the Susquehanna River and conveying the current to Baltimore, is said to have secured subscriptions to nearly $10,000,000 of its capital, and is about to sign a contract for electrical machinery, involving an expenditure of $3,000,000.

The Seattle Iron & Steel Co., Seattle, Wash., is meeting with much encouragement in its effort to increase its capital stock and enlarge its plant. The Chamber of Commerce of Seattle has endorsed the plan, as have also real estate men who have subscribed for $11,000 worth of stock.

Grant & Williams, dealers in scrap iron and steel, at No. 21 Park Row, New York, have made an assignment. The liabilities are $100,000, and the assets are not stated.

NEW ENGLAND FOUNDRYMEN'S ASSOCIATION.

The live character of the New England Foundrymen's Association has been well attested in the past year by the excellence of its programs and the numbers in attendance at its meetings. Secretary Fred F. Stockwell made a departure for the summer, by arranging for two outings. The second of these, which involved a Rhode Island clambake, was in charge of the Providence members of the association, and was held on Aug. 12. A ride down Narragansett Bay in a chartered steamer was a feature, and on arriving at Newport cars were taken for a ride about that charming place. The clambake at noon was followed by the photographing of the party, in which there were nearly 100. A reproduction of the photograph is given herewith. The affair was voted one of the most successful social events in the association's history. With the September meeting, the association resumes its regular sessions for the reading and discussion of papers.

An order has been made in the United States court at Atlanta, on petition of receivers of the Southern Car & Foundry Co., authorizing them to proceed with the operation of the Gadsden plant of the company, and also authorizing the receiv-

The Eastern Machinery Market.

OFFICE OF *The Iron Trade Review*,
ROOM 1909 No. 150 NASSAU ST., NEW YORK, Sept. 1.

August in the machinery trade in this vicinity must be put down as dull. No one at the opening of the month expected it to bring about any notable increase in business, because it is the time most fancied for vacations. Many of the machinery houses were depleted of their forces during the month. Even those who were at their desks found little to engage their attention, and had time to talk about the yacht races, or go to them. Several machinery houses entertained their customers in connection with these events, especially Manning, Maxwell & Moore, who chartered a steamer on which over 200 of their customers from this and other cities followed the yachts.

The most gratifying development of the month was the feeling of confidence which characterized it. During July there were many machinery men who viewed the business outlook with uneasiness. In the past few weeks these have become convinced that trade during the balance of the year is going to be good, some expressing the belief that it will mark totals for the year very near those of last year.

In machine tools, no large propositions came to the front. The report that the General Electric Co. is in the market for a large number of tools, is not correct. We have it on the highest authority that the only purchases the company has in contemplation are to equip its new building in Schenectady. This will not be finished for six months yet. We are also informed that the only purchases the company will make at present will be four 30-ton or 50-ton cranes. The specifications for these will be ready shortly.

Other large items mentioned in previous reports are still hanging fire. The Ingersoll-Sergeant Drill Co. is apparently in no hurry to purchase the equipment for its new shops at Phillipsburg, N. J. It is pushing work on its foundry and has given out the order for the cranes, etc. The company has placed an order for two large boring mills, which the Niles-Bement-Pond Co. captured. The machines will take about nine months to build. The remaining orders for the machine shop will probably not be given out for some time.

The attitude of the International Steam Pump Co. in connection with the equipment for the new shops of Henry R. Worthington, at Harrison, N. J., is a mystery to the "street." The specifications are still delayed, but the Niles-Bement-Pond Co. is expected to get the bulk of the business.

There are still a large number of railroad propositions forthcoming, all depending on the attitude of railroad officials to-

OUTING OF THE NEW ENGLAND FOUNDRYMEN'S ASSOCIATION AT NEWPORT, R. I., AUGUST 12.

ers to pay the wages due the men at that plant. It is expected that this will enable the receivers to start the plant promply, and that similar orders will be made for the other plants of the company at an early date. It is expected that the Anniston plant will be one of the first to start.

The Riverside Bridge Co., Wheeling, W. Va., recently organized for the purpose of manufacturing the heaviest types of railroad bridges and viaducts, steel mill and factory buildings and other heavy construction, has completed the building of its new plant at Martin's Ferry, O. The site is admirably suited for railroad accommodations. The buildings are: main bridge shop, 150x300 feet; foundry, 40x80 feet; two machine shop buildings, 40x80 feet and 40x60 feet, and one forge shop, 30x80 feet. The plant has a capacity of 1,500 tons of material a month and will employ about 200 men.

For some time the Morgan Machine Co., Rochester, N. Y., has planned to extend its plant. It finally decided on a location in a suburb of Rochester. Some difficulties have arisen, however, in the city council, and the attorney for the company says that the plant may be moved to Buffalo.

ward expenditures for betterments, plans for which are held up for the present. There have been some railroad cancellations on iron and steel contracts, a good deal still hinging on the crops.

Machine tool men are greatly interested in what the Loomis-Pettibone Gas Machinery Co. is going to do, now that it has purchased the mining machinery plant of the Holthoff machinery Co., of Cudahy, Wis. The company some time ago purchased a large plot of ground at Linden, N. J., for the erection of a plant. The specifications for the equipment have been in the hands of the trade for several months, and there is considerable curiosity as to whether the company will build anew or utilize the Cudahy plant for its purposes. At the office of the company it was stated today that no decision will likely be reached for several weeks. All of the men who had the proposed Linden plant in charge have been sent permanently to the Holthoff plant.

Miscellaneous business in machine tools has been fair, and prices are being maintained. Deliveries are getting better, and one of the best houses says that if by any possibility September shall be no improvement in orders over August, delays in deliveries are likely to be a thing of the past.

In engines and boilers, August has been dull. It has been noticed that there was reluctance to go ahead with new industries calling for power. Orders for engines and boilers for installation in office and hotel buildings, as well as apartment houses, have especially fallen off. New York City and Eastern centers have suffered most, but this applies also to all parts of the country. Engine and boiler men expect no improvement in September, experience showing that September and January are the dullest months of the year with them. Prices are only fairly firm, in many quarters the anxiety to get orders having brought about concessions.

In electrical machinery only fair activity developed during the month. The majority of orders were for small propositions. Prices are not as firm as they have been. The belief is strong, however, that September will bring a good volume of orders. In power transmitting machinery and machinists' supplies a fair demand has been noted.

The export trade for August was a little improved. Houses which make a specialty of this trade, say they have had more correspondence in connection with it recently than in some time, with an order resulting now and then. Yet many houses are unwilling to do anything toward obtaining orders from abroad.

The Lidgerwood Mfg. Co., of 96 Liberty St., was very anxious to build the foundry and power house in connection with its new plant at Newark, N. J., this year, but has given up hope of having them in operation until next spring, because of the labor situation. The company recently received construction bids, but will not award contracts for the present. The purchase of the equipment will go over until nearly next year.

George Place, the local representative of the J. A. Fay & Egan Co., has received some good orders recently for woodworking machinery from railroads, especially the Delaware, Lackawanna & Western. Mr. Place says export trade is looking up, and that Europe is beginning to think more of the merit of American tools and less of their cost, and is buying more freely in consequence.

The recently incorporated United States Chaplet Co., of which H. H. Kress is president, has recently installed some new machinery in its plant at Lebanon, Pa. The company has booked some large orders during the past month.

The management of the Stoever Foundry & Manufacturing Co., of Myerstown, Pa., has been changed. Ralph McCarthy, formerly connected with the Bignall & Keeler Manufacturing Co., of Edwardsville, Ill., is now president and general manager. John H. Killinger has been made vice president, instead of M. H. Treadwell, who is still a director, however. This company is now having plans drawn for improving its plant, which will necessitate the installation of some new machinery.

The American Ball Engine Co., of Bound Brook, N. J., through its New York representative, E. S. Boyer, of 95 Liberty St., has received an order for one 160-h. p. single direct connected engine from the American Car Co., New York City, and one 125-h. p. duplex compound engine from the Hungerford Electric & Mfg. Co., Essex, N. J. Mr. Boyer has some good contracts pending which he expects to close in a few days.

M. W. Treadwell & Co., Inc., of 95 Liberty St., report that in August they entered some very good orders. A good many customers who had been holding off bought equipment owing to increasing business. They have taken a large lot of cast iron work which they were obliged to sublet to other foundries owing to their own foundries being filled up. The company received orders, among others, for five cinder cars for the Illinois Steel Co. for the South Chicago Works, and three from the Clairton Steel Co. for the St. Clair furnaces at Clairton, Pa. They have also just completed the installation of a large crane in the Benj. Atha Steel Works, Newark, N. J., and two in the Central Iron & Steel Works at Harrisburg, Pa. The company has opened at office at Room 309 in the Pennsylvania Bldg., cor. 15th and Chestnut Sts., Philadelphia, Pa., which will be in charge of R. D. Granger, formerly connected with the J. Edw. Ogden Co., New York, and later with the purchasing and sales department in the New York office of M. H. Treadwell & Co.

Trade Publications.

The general catalogue of the Whiting Foundry Equipment Co., of Harvey, Ill., comprises a series of pamphlets on cranes, electric travelers, cupolas, air hoists, trucks and turntables, power sand sifters, core oven fittings, air melting furnaces, annealing ovens, charging trucks, steel casting plants, elevators, ladles, etc. These are bound in a substantial manner.

The Otis Elevator Co., of New York, N. Y., has a catalogue of the extensive line of elevators, electric, hydraulic steam and belt driven. These are built for passenger and freight service and, as will be understood, are of a great variety of forms for almost every imaginable elevator purpose.

"Pumping by Compressed Air," is the title of a pamphlet prepared by the Pneumatic Engineering Co., of New York, N. Y. This method of raising water is not any too well known and the description in the pamphlet is improved by the addition of a number of artistic illustrations.

Circulars of the B. & J. shovel handles (D's), the Buhl chain with attachments for conveyor flights or elevator buckets, sprocket wheels, etc., are distributed by the Buhl Malleable Co., of Detroit. The links of the chain are of malleable iron and are assembled with one-inch cold-rolled steel bolts.

A new grate bar catalogue is from M. H. Treadwell & Co., of New York. The publication relies largely upon the illustrations to tell the tale and these show the device in detail and in place. The bars are presented in a variety of forms and the general arrangement is outlined very clearly.

Direct current factory motors are the burden of bulletin No. 65, sent by the Rochester Electric Motor Co., of Rochester, N. Y. The motor frame is a single casting and the end plates may be swung around with the bearings as these are bolted to the main frame. In this manner the machine may be placed either on the floor, wall or ceiling. The type "C" motor is built up to 30 horsepower.

The Globe Machine & Stamping Co., of Cleveland, has been unusually busy during the midsummer months and received more orders for improved oblique tumbling barrels during June, July and August than during March, April and May. Work on dies for blanking and forming sheet metals has been about normal, while orders for drop forging dies have dropped off somewhat. The company has not been compelled to lay off any men during the summer. Labor conditions are reported fair. The company finds that it is getting more applications for work recently than during last spring, which seems to indicate a surplus of labor in the line of floor hands, machinists' helpers, drill press hands and punch press operators. Inquiries for quotations on new work decreased during June and July, but on the other hand there is an unusual increase of inquiries at present and during the past three or four weeks.

Eden & Co., of Bridgeport, Conn., have lately equipped their shop with a new line of machinery, greatly increasing their facilities for rapidly handling special work, tool-making, etc.

Philadelphia Machinery Market.

PHILADELPHIA, Sept. 1.—The consensus of opinion in the machinery trade seems to be that August, in point of volume of business secured, was the worst month in three years. May, June, and July, all showed signs of the coming lull, but few in the trade expected to meet the conditions which have existed during the past four weeks. Inquiries as well as orders fell off to a remarkable extent and shipments, too, were less than they have been. Another condition which has been freely remarked upon is that never before have vacations been so general. Buyers and sellers both seem to have settled upon the month just closed as a good time to get away, and business has been largely left to take care of itself. For three years the machinery world has been too active to admit of much leisure on the part of those engaged in it, and the present lull in business is being made the most of. Nor is there much alarm in trade circles over the outlook. A great deal of estimating is going on in the different lines and prices are firm, both indications that the existing conditions are but temporary. Many good sized contracts are up to the closing point, and it is quite expected that the end of September will see a marked improvement in the market.

Labor questions are occasioning little or no concern, and there is no immediate prospect of any trouble in this direction. The recent strike in the textile districts has had some effect upon the local demand for machinery and supplies, but the strikers are gradually going back to work, and it is not expected that the strike will last much longer.

The effect of diminished business is easily seen. There appear to be plenty of machinists in supply; not the best kind, but such as found no difficulty in getting employment during the boom. Pattern makers' shops are rather dull, and proprietors are hustling somewhat to get what business is going. What is perhaps a surprise, is the fact that the steel foundries are out after business, something they have not had to look for for a considerable time.

The demand from abroad is a trifle better, but that is not saying much. The inquiry seems to run more particularly to heavy machinery.

The Geo. V. Cresson Co., maker of power transmission equipment, reports business as fair. The company has recently taken some good orders from home sources, and has also booked a good sized order for shipment to a Mexican concern.

The Southwark Foundry & Machine Co., builder of large engines, is completing some large blowing engines for shipment to Bolckow, Vaughan & Co., Middlesboro, Eng., who operate one of the largest iron and steel plants in that country. It is reported that the Southwark company has made arrangements with an English firm of engineers for the building of Southwark blowing engines in England.

The activity at the Baldwin Locomotive Works is as great as ever, but the influx of orders has diminished very noticeably. Business, however, is still very good, and much beyond the normal standard. Locomotives recently secured included orders from the Atlantic Coast Line for seven, from the Union Pacific Railroad for ten passenger locomotives, and from the Mexican National Railway for five passenger and five freight locomotives. The new shops at 27th and Aspen Sts. are well under way and will soon be under roof; and a contract has just been awarded for a $9,000 powerhouse and a stack to cost $6,000, at the same plant.

The Standard Pressed Steel Co. is the name of a new concern which occupies the buildings recently vacated by the Keystone Drop Forge Co. at Germantown Junction. The plant has been equipped with powerful machinery for turning out work in pressed steel, and also for a line of pressed steel shafting hangers which will shortly be placed on the market. The concern is incorporated under the laws of Pennsylvania, and starts out with good prospects for business.

The Quaker City Electric Co. continues very busy on work in hand for electrical power transmission equipment. Among the orders booked during the month was one for power transmission equipment for the factory of the Philadelphia Paper Co. at Manayunk.

Israel H. Johnson Co., builder of lathers, reports business as satisfactory. Shipments during August covered mainly lathes of small sizes and standard types. There has just been put on the market an electrically-driven lathe with variable mechanical speeds, which has been found to be very efficient during the period it has been running on work in the company's own shops. In the roughing out department it has been found to have a capacity three times greater than any other lathe.

The Harrison Safety Boiler Works are quite busy, mainly on orders for Cochrane feed water heaters and separators.

The Nagel Machine Tool Works have recently put upon the market a line of centering machines, and have secured several orders for them. Their shops are fairly busy, their jobbing shop particularly.

The Keystone Machine Works, builders of cold saw cutting-off machines, boring machines and other tools, state that business is good with them. Shipments made during August were mostly confined to cold saws for different points.

The Espen-Lucas Machine Works booked some nice orders during the month for cold saw cutting-off machines, some of them duplicate orders from parties already having these machines. Until a week ago the state of their order book has necessitated the running of their plant on night work.

The Hess Machine Works have received three good orders from Europe for their file-making machines. Business is reported at the plant as being little if anything below the usual standard.

The Falkenau-Sinclair Co. has a good deal of work in hand. During the month it has made a good many shipments, including an 18-foot shaper with traveling head to the Boston Navy Yard, and a large multiple drill to local parties. Quite a number of standard presses and tools also were shipped. The testing machine department is very active, some large sized machines being under way.

The Newton Machine Tool Works continue busy and several orders of good size were booked during the month. Shipments were light, and consisted mainly of small and unimportant tools. Among the larger shipments was one of a special boring and milling machine to the American Locomotive Works, and another of a big vertical miller to the Rock Island Arsenal. A number of cold saws and slotters were shipped, the majority of them to railroad shops. Another shipment of twelve special milling machines was made to T. H. Symington & Co., of Baltimore. This makes thirty shipped to this one concern. The manager of the Newton Works states that the expectations are that September will be the largest shipping month in the history of the concern. A lot of machines to be ready for shipment this month are to go to the Montreal Locomotive Works. The equipment for the new Newton shop is all arranged for, and most of it is in the shop. One large and several small planers are yet to be purchased.

Obituary.

James A. Taylor, member of the firm of William Taylor & Sons, iron manufacturers, Brooklyn, N. Y., died Aug. 20, at his summer home in Cooperstown, N. Y. He was born in Brooklyn in 1834.

Adam C. Brinson, a stockholder in the Perkins Mfg. Co., and secretary of the Georgia Iron Works, died at his home in Augusta, Ga., Aug. 24, aged 50 years.

John Mohr, one of the early citizens of Chicago, died Aug. 20, aged 77 years. He was senior member of the firm of John Mohn & Sons, boiler manufacturers.

Cyrus D. Hunt, of Fairhaven, Mass., a pioneer in tack manufacture, died Aug. 19, aged 70 years. In 1862 he entered the employ of the American Nail Machine Co., of Boston, and when the company transferred its plant to Fairhaven that year he was placed in charge, and it was through his influence that the company commenced the manufacture of tacks and small nails. In 1867 the company was reorganized and named the American Tack Co. In 1891 it was merged into the present Atlas company, and Mr. Hunt retired after a service of 26 years. Mr. Hunt invented and patented a number of valuable attachments for a tack machine, and also a complete machine.

NEW AUTOMATIC CEMENT TESTING MACHINE.

The Falkenau-Sinclair Machine Co., of No. 109 North 22d St., Philadelphia, is introducing a new automatic cement testing machine, the patent for which was recently issued. The Michaelis machine was one of the pioneers in this field, and it and machines following its general type are in general use today. The machine we illustrate is to a certain extent of the same type as the Michaelis machine, but with the important distinction that the manner of using the shot is reversed, as will appear below.

Briefly, the principle of this machine is to balance two weights on the beam, one at either end. By removing one weight gradually, the other, through the lever system, applies a constantly increasing load on the specimen until it breaks. The removal of the weight is automatically stopped at the instant the specimen breaks. The load which broke the specimen is then obtained by weighing on scales provided for this purpose, the weight removed. The removable weight consists of shot, and the scales used are preferably a spring balance whose readings represent the load on the briquette. Beam scales, however, can be used if desired.

In the machine we illustrate, 15 pounds of shot are sufficient to apply 1,000 pounds strain on the briquette. Shot is used in

NEW AUTOMATIC CEMENT TESTING MACHINE.

this machine. While water and perhaps other materials have been used, it has been found that for practical purposes lead shot is the most universally successful medium for applying the load. A feature of this machine is the application of the load smoothly, by allowing another load on the opposite end of the lever to run off; in other words, while in the Michaelis type of machine the load is applied by running shot into the receptacle on the beam, in this machine the load is applied by running it out of the receptacle. The counterweight on the end of the lever, to the right in the cut, is the weight that applies the load, and the receptacle at the other end of the beam holds the shot. If the shot is allowed to escape from the receptacle the same proportionate amount of the weight at the other end of the beam will come into action in producing stress on the briquette. It is evident, therefore, that if the stream of shot which is escaping can be shut off the instant the briquette breaks, the weight of all the shot which has escaped from the receptacle at that instant has aided in breaking the briquette, and therefore the entire amount of the escaped shot should be weighed, in order to give the amount of weight acting on the briquette.

In the Michaelis and other shot machines there is a column of shot falling through the air, extending from the nozzle of the receptacle to the pan, which has had no effect in breaking the briquette, but notwithstanding is caught in the pan and weighed.

There is another source of error which, although perhaps small, should be eliminated if possible—the impact of the shot on the briquette. In the new machine this impact is not transmitted to the briquette, for as the falling shot escapes from the beam the load at the other end is applied with absolute smoothness. Another advantage is the improved form of "shut-off" which cuts off the escaping stream of shot practically at the instant the briquette breaks. Further the grip and entire apparatus is so rigid and free from deflection under maximum load that a small travel of the weight on the end of the lever develops the full capacity of the machine. The necessity of taking a second hitch on the briquette, or putting on additional weights, or any other device of that nature, is avoided and the test is automatic from start to finish.

In order to facilitate operations in the field or in very busy laboratories, the builders furnish a spring balance for weighing the shot. The dial on this balance is graduated up to 1,000 pounds, which is the capacity of the machine, and the pointer gives the reading of the load applied to the briquette, so that there is no calculation required and no further manipulation to get the weight. The instant the briquette breaks the operator glances at the pointer on the dial and reads the load at which the briquette broke. The spring balance can be replaced by lever scales, if so desired, but only at the cost of retarding the operation, as it would then be necessary to move a poise out on a beam or apply weights until the shot which had fallen into the pan was weighed. The builders of this machine recommend the use of the spring balance, and while recognizing the prejudice of many engineers against using spring balances, they claim that in this case such prejudice is not well founded, as the spring in the spring balance can be tested every day if desired, by placing known weights in the pan. The spring has an adjusting nut, so that should any adjustment be necessary it is readily made.

Central and Eastern Pennsylvania.

HARRISBURG, Sept. 1.—The fall months will find almost all of the works in this section with enough orders to keep them going until the snow flies. There have not been any large bookings lately, but there has been a steady run of orders, and work promises to be plentiful for the thousands of employes. The Pennsylvania Steel Co. is said to have some very large structural contracts ahead, and the Maryland company will handle many rail orders.

The troubles in the shipbuilding trust are apparently not stopping work at the Bethlehem Steel Works. That plant has had a busy fall and is going ahead.

The Pennsylvania Steel Co. will enlarge furnaces Nos. 3 and 4 some time this winter, according to present plans. They were built in 1883 and have been in continuous service.

An effort is being made to form a combination of the axle works of this part of the State with those in nearby States.

The Pittsburg Gas Coal Co. has awarded a contract for 2 500-h. p. engines to the Harrisburg Foundry & Machine Works.

Manufacturers in this part of the State agree in predicting that there will be a good fall for the rolling mills and foundries. They say that considerable work is moving. Along the Delaware there are also reported good conditions. Chester steel casting works will be busy this fall. Good conditions prevail in the Schuylkill region.

The new DuBois furnace of the Rochester & Pittsburg Coal & Iron Co., which was started this month, is making a fine product and a good record as to output.

The Lackawanna Iron & Steel Co. may construct still more coke ovens at Lebanon for its Colebrook furnaces. The original plant has been successful.

The Reading railway has started building heavy freight locomotives at its own shops in Reading. Ten will be built this fall.

William C. Lockhart, one of the best known foundrymen in eastern Pennsylvania, died in Reading. He was the head of the Scott works of the Reading Iron Co., and his work was the basis of some references in standard text books.

The Shelby Automobile Co., of Shelby, O., has filed a schedule of assets and liabilities in its involuntary bankruptcy case. The schedule shows unsecured claims to the amount of $59,964.03, and notes and bills due $17,383.30. The total indebtedness is $84,476.05. The total assets amount to $43,449.50.

Cincinnati Machinery Market.

CINCINNATI, Sept. 1.—Early in the month of August there was some falling off in orders for machine tools and shops which had been behind in their orders were able to catch up. As the month closed there was a decided improvement in the business. It seems as though the fall trade had opened up. Orders came by wire and there was such a pronounced revival in the demand for machines that the market had the appearance of renewed activity. Taken as a whole, the month just past has been quite satisfactory, despite the evidences of midsummer lassitude which characterized the opening.

The strain under which the shops have been in the past year or more to keep up with rush of business offering, has left no time for general house-cleanings and the brief breathing spell has enabled some of the shops to make needed changes in their work rooms. Whitewashing and window cleaning have been accomplished and there is now an air of tidiness and order about the shops that has not been so much in evidence during the rush period. The shops present an attractive appearance and the visitor to the machine tool works district is impressed with the conveniences provided for the employes in the way of light and cool workshops, lockers for clothing, wash rooms etc. Flower beds and nicely cared-for grass-plots are also noticeable features.

The Fosdick Machine Tool Co. reports trade satisfactory, considering summer conditions. Prices are well maintained. Correspondence with agents and prospective customers gives an encouraging tone to the outlook for fall trade.

The John Steptoe Shaper Co. has undergone a change of management in the past month. The bulk of the common stock has been transferred to another set of stockholders, although the old officers still remain in the directory. The new officers are: Alexander Dom, president and general manager, and O. H. Broxterman, secretary and treasurer. Mr. Dom was for a number of years connected with the Globe Wernicke Co. and Mr. Broxterman is a son of John Broxterman, receiver of the Foss-Schneider Brewing Co. The business is to be conducted on the same lines as heretofore. The new management takes hold with a nice run of orders ahead. Foreign business is showing some improvement and six export orders have been booked this month. The machines for export will go to Denmark, Sweden and Australia.

The Rahn-Mayer-Carpenter Co. closed their shop for a week for general house-cleaning, but they are now running full again on orders received in the past ten days.

The Cincinnati Machine Tool Co. has let the contracts for its new building on Spring Grove Ave. and work has commenced. Business is good and orders are coming along nicely, especially in the latter part of the month.

The Cincinnati Milling Machine Co. says business has been fairly good the past month, with orders fully up to August a year ago, and the summer business ahead of last year. The new addition to the company's shop will be ready for occupancy early this month.

Greaves, Klusman & Co. say the latter part of August was remarkably good. They have been running full all summer and have had a good run of well distributed orders. They are bringing out a new line of turret lathes which they believe will attract business.

The Cincinnati Planer Co. says that while there has been some falling off in orders they are not dull. The company is installing a new engine and preparing to drive all machines with electricity.

The Laidlaw-Dunn-Gordon Co. plant at Tweedvale, O., has just completed two 6,000,000-gallon pumping engines of the crank and fly-wheel type. They are three-cylinder compound engines with Corliss valve motion, specially designed for blast furnace work. The engines are for Yorkshire, Eng., and are now ready for shipment. The company reports business good and orders heavy.

Schumacher & Boye say business is now just in the shape they like to see it. They are running full but they are in position to promise deliveries with assurance of being able to fill the order promptly. There is just enough business coming in to keep them running nicely. This company's line of quick-change gear lathes is gaining in popularity.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of Their Wants:—

R. G. Weber, secretary of the Weber Gas & Gasoline Engine Co., Kansas City, Mo., has returned to that city from the City of Mexico, where he finished the organization of a new company to be known as the Weber Gas Producing Co. of Mexico, which was incorporated with a capital of $500,000. Controlling interest is owned by Kansas City capitalists. The company has been formed for the purpose of manufacturing gas from charcoal as power for engines. George J. Weber, who is president of the company, is the inventor of the process and apparatus for doing the work.

The Standard Bale Wire Buckle Co. has been organized at Memphis, Tenn., and has rented a building for temporary operation, but will build a plant for the manufacture of cotton bale buckles.

The Spray Woolen Mills Co., Spray, N. C., wants 125 to 150-horsepower second-hand Corliss engine; give make, age and best price.

W. H. Carr, Rochelle, Ga., wants to correspond with manufacturers of iron and steel specialties relative to having a patent device manufactured.

Wm. Weber, Beaumont, Texas, will want prices on steel cages, cells, etc., for jail.

The Citizens' Light & Transit Co., Pine Bluff, Ark., is in market for a 24-inch swing lathe.

The Jackson Bros. Co., Whaleyville, Va., wants portable boring bar to bore taper holes in crank of engine and Wickes gang; also to bore cylinders of engine and pump.

The Grundy Stove Co., Guelph, Ont., has been incorporated with a capital of $40,000 to manufacture stoves, furnaces, etc.

The Gunther-Wright Machine Co., Owensboro, Ky., has been incorporated with a capital of $100,000. The company will do a general foundry business.

The H. R. Ives Co., Montreal, has been incorporated with a capital of $350,000, to acquire the business of H. R. Ives & Co., and to manufacture brass and iron bedsteads.

The Bullock-Beresford Mfg. Co., Cleveland, has been incorporated with a capital of $5,000, to manufacture gasoline engines.

The Roy Iron Co., Duluth, Minn., has been incorporated with a capital stock of $100,000.

The Celoron Steel Co., Celoron, N. Y., capital $50,000, has been incorporated.

The Trebert Gas Engine Co., Rochester, N. Y., has been incorporated with a capital of $50,000.

The Kentucky Plow Fender Co., with a capital stock of $10,000, has been organized at Hawesville, Ky.

The Scott Iron Mining Co., Menominee, Mich., capital $125,000, has been incorporated.

The Galena Iron Works Co., Galena, Ill., has decided to increase its capital to $20,000. It is the intention of the company to secure larger quarters. A foundry will be established in connection with the machine works. A building formerly used as a packing plant has been purchased and will be improved and repaired for the use of the purchasing company.

The Madeira-Hill-Clarke Co., Fairmont, W. Va., has been incorporated with a capital of $300,000, to mine coal and manufacture coke.

The Taylor & Saylor Coal & Coke Co., Kingwood, W. Va., has been incorporated with a capital of $100,000.

The Fisher Mfg. Co., Wheeling W. Va., has been incorporated with a capital of $50,000 to manufacture iron and brass.

The Boys' School, Atlanta, Ga., W. F. Slaton, superintendent, is in the market for equipment for the shops of the technological course.

The Southern Foundry Co., Dallas, Texas, has been incorporated with a capital of $5,000, and has leased the works of the Ginners Machine Co., and will commence the manufacture of smoothing irons and will do general foundry work.

The Standard Foundry Co., Buffalo, has been incorporated with a capital of $10,000.

The Buckeye Gas & Gasoline Engine Co., Aurora, Ill., capital $20,000, has been incorporated to manufacture engines and

mechanical appliances. It is not a new concern, but it has been incorporated in order to carry on business on a larger scale.

The Chicago Expansion Steel Kiln Co., Chicago, has been incorporated with a capital of $50,000, to manufacture steel kilns.

The Buckeye Gas & Gasoline Engine Co., Aurora, Ill., has been incorporated with $20,000 capital for the purpose of engaging in the manufacture of gas and gasoline engines. Peter Michels, Harry J. Cooper and O. J. Wilson are the incorporators.

A stock company is being formed at Platteville, Wis., to establish an iron foundry, and $12,000 worth of stock has been subscribed. Those interested are considering the purchase of the Galena Iron Works of Galena, Kansas, owned by W. G. Bryant, of Carterville, Mo.

The Luitwieler Pumping Engine Co. has recently been incorporated under the laws of California with a capital stock of $200,000, to succeed the S. W. Luitwieler Co. It will manufacture pumping machinery.

The Marine Railway, Machine & Boiler Works, Baltimore, have been incorporated with a capital of $10,000. The incorporators are: Edward J. Codd, William C. Codd, Frank L. Mohler, Vernon V. Codd and J. Henry Baker.

The Menomonee Falls Boiler Works, Menomonee Falls, Wis., have been incorporated with a capital of $10,000.

The Trebert Gas Engine Co., Rochester, N. Y., has been incorporated with a capital of $50,000. The incorporators are: Henry L. F. Trebert, J. George Wagner, Jr., and Thomas Corkhill.

W. A. Jones Foundry & Machine Co., Chicago, has been incorporated with a capital of $100,000, to do general foundry and machine work. The incorporators are: Albert H. Tyrrell, R. J. Fellingham, and Clyde O. Garmire.

L. S. Heald & Co., Barre, Mass., have incorporated their grinder business as the Heald Machine Co., with a paid in capital stock of $40,000. The business has been moved to Worcester, Mass., and will be located in the shop formerly occupied by the Morgan Motor Co.

Fires and Accidents:—

The recent fire in the plant of the John O'Brien Boiler Works Co., St. Louis, was not as disastrous as reported. The fire occurred in the sheet iron department and very little of the large machinery was destroyed. The works were closed only one day.

One man was killed, another probably fatally injured, and others severely injured by an explosion in the engine room of the new blast furnaces at the Illinois Steel Co.'s South Chicago plant, Aug. 28. The loss of property by fire and explosion is estimated at $20,000.

For the second time in less than a year the Santa Fe shops and round house at Beaumont, Tex., were totally destroyed by fire, Aug. 24. Loss $100,000, of which $75,000 was due to the destruction of 7 engines.

Fire recently damaged the two-story brick building at Quay and Franklin Sts., Brooklyn, N. Y., occupied as an iron foundry by the Burr & Houston Co. Damage to building and contents, $5,000.

New Construction:—

The Powell Coal & Coke Co., Powells, W. Va., is building 100 coke ovens at Powell Station, erecting crusher, washer houses, etc., and opening up mines. The company's general office is in the Farmers' Bank Bldg., Pittsburg.

The Baltimore & Ohio Railroad Co., has received bids for the construction of additional shops for its Mt. Clare plant. The plans call for erecting shops 73x300 feet, and machine shop 58x300 feet; both to cost about $60,000.

The Manufacturers' Foundry Co., Waterbury, Conn., manufacturer of brass and iron castings, is building a foundry 80 x400 feet.

The S. M. Jones Co., Toledo, O., has let the contract for its new machine shops and foundry. The buildings will be 40 feet in height and modern and fire proof throughout. The machine shop will be 261 feet by 75 feet, with an engine room 82x25 feet, and a boiler room 48x40 feet. The foundry will be 101x140 feet with two wings. The buildings will be of brick and iron, the contract for the latter having been awarded to the Donovan Wire & Iron Co. It is expected that the construction will be finished by November 1st. The estimated cost is $50,000.

It is expected that the construction of the new tin plate mill of the Colorado Fuel & Iron Co., at Pueblo, will be finished Dec. 15. An extra force of men have been put to work.

The plant of the Washington Pipe & Foundry Co., Tacoma, Wash., is to be quadrupled.

Fay & Scott, Dexter, Maine, are building an addition to their foundry, which will double its capacity. They recently installed several new tools, and are in the market for additional foundry equipment.

The Central Foundry Co., Ft. Wayne, Ind., is building an addition 50x60 feet. The foundry was started about two years ago. The capacity will be doubled by the addition.

The E. J. Manville Co., Waterbury, Conn., is building a brick machine shop 2 stories, 55x320 feet, and other buildings.

The Pickering Governor Co., Portland, Conn., has purchased land adjoining its property, and will build an addition.

The Olds Gasoline Engine Works has bought a 16-acre site at Lansing, Mich., and will build a plant to triple the capacity of the present works.

The Iowa Iron Works, Dubuque, Ia., hold a patent on a new style of steamboat boiler and contemplate the erection of a plant at the cost of $150,000.

The Edison Foundry & Machine Works, Edison, O., recently incorporated, expects to put up a new building and equip it with new and modern machinery throughout. It has promises of considerable work already and expects to make a general line of iron and brass castings, as well as general repairing. P. S. Plumb, former foreman in the foundry department of the Shelby Stove Manufacturing Co., has organized this company and will be its manager. A number of molders and coremakers from Shelby, Mansfield, and Bucyrus have taken stock in this company and will be engaged to work for it. The directors and officers are: Frank Romans, president; W. G. Lefener, vice president; W. G. Haas, secretary and treasurer; directors, Frank Romans, F. C. Gillson, W. G. Lefener, W. G. Haas, P. S. Plumb, W. B. Engel and J. M. Welbourn.

The Burrell Mfg. Co., Bradley, Ill., is putting up a foundry, 40x80, brick, with iron roof, 5 tons capacity.

The Wheeling Stove & Range Co., Wheeling, W. Va., will erect new buildings and largely increase its output of stoves as soon as a desirable site can be obtained.

The Allentown Foundry & Machine Works, Allentown, Pa., have started erecting a large new machine shop, 80x200. Upon completion of this building the intention is to increase the foundry about 150 ft. more and the company will be in the market for lathes, planers, gear cutters, drill presses, grinding machines, turret lathes, and all kinds of machinery pertaining to machine shop work. The company would be pleased to receive catalogues from machine tool builders.

The Cochrane & Bly Machine Works, Rochester, N. Y., are erecting a plant 200x40 feet with an L containing 10,000 square feet. It fronts on St. James park and will be ready for use Nov. 1. The company which manufactures filing machines, cut off saws and universal shapers, is now located at 7 Griffith St.

George and William Black, Erie, Pa., have purchased the interests of Willis and H. A. Brown in the Walker foundry. The plant will be enlarged.

The Jarvis Engine & Machine Works, Lansing, Mich., will build a new machine shop and office building at a cost of $10,500.

The Waterbury Brass Co., Waterbury, Conn., has awarded the general contract for an addition, which will be a machine shop, three stories, 146x194 feet. It will be built in the form of a hollow square with an open enclosure in the center of 60x108 feet.

The West Allis Malleable Iron & Chain Belt Co., West Allis, Wis., will add 208 feet to the foundry, doubling the size of the annealing ovens and extending the chain belt department. The company has recently commenced making gray iron castings.

The Central Iron & Steel Co., Harrisburg, Pa., has let the

contract to the Pennsylvania Steel Co., of Steelton, Pa., for the rebuilding of its No. 2 mill, destroyed by fire several months ago. The new structure will be entirely fire proof and will be ready for operation January 1.

The Johnston Harvester Co., Batavia, N. Y., has added several foundry and machine shop buildings and a new power house to its plant. Other improvements are to be made, and when all are completed, the plant will give employment to about 1,600 men.

The Washington Pipe & Foundry Co., of Tacoma, has secured the contract for furnishing the water pipes for the city of Dillon, Mont., the contract price being $61,000.

An addition to the plant of the Buffalo Malleable Iron & Steel Co., Buffalo, has been completed, giving employment to 350 additional men.

The Simplex Railway Appliance Co., Hammond, Ind., is erecting a steel frame addition, 180x300 feet, and will manufacture coil and elliptic springs.

The Pittsburg and Valley Districts:—

The new plant of the Schoen Pressed Steel Wheel Co., at McKees Rocks, Pa., will shortly be placed in operation. Steel blanks from which the wheels will be made will be cast at the plant of the Pennsylvania Malleable Co., which adjoins the wheel plant. One of the furnaces in this plant now on malleable iron is being prepared to turn out steel. The machinery for rolling the wheels is already in place, and it is anticipated that the first wheel will be turned out within a few days. According to present estimates, the cost of the new wheel will be about $26, standard passenger coach size. If they can be made at this price they can easily be sold in competition with the steel tired wheel, which averages in price from $40 to $50 each. On the other hand it is doubtful whether this wheel will replace the present cast iron wheel for general freight use, as it averages in price only from $11 to $14. Another company is now being promoted to manufacture a steel wheel according to the Wheeler patents. Instead of being rolled from a cast steel blank, the wheel is rolled from a bloom, and it is claimed by the patentee that the wheel has advantages over the Schoen wheel, inasmuch as the steel receives a number of passes in its crude state before it is placed on the machine to be rolled.

The open-hearth plant of the Duquesne works of the Carnegie Steel Co., is off temporarily for repairs.

The Westmoreland Steel Co., of Pittsburg, Pa., has awarded a contract to James J. Mahon, contracting engineer for the erection of a modern annealing furnace at its plant, Greensburg, Pa. Only steel for high grade tools is to be annealed in this furnace, and it will be of a special design for this purpose.

The foundries of the Westinghouse Electric & Mfg. Co., Trafford City, Pa., will shortly be placed in operation.

The W. J. Rainey estate has completed 100 new coke ovens at the Revere coke plant near Uniontown, Pa. This additional battery will give the Revere plant 650 ovens, making it the second largest single plant in the entire Connellsville region.

Owing to the increased output of the Bessemer plant of the Republic Iron & Steel Co., Youngstown, O., due to the installation of two new converters, the wages of the men in this department have been slightly reduced. Under the new scale, with the increased output taken into consideration, the men will be able to make larger wages than heretofore.

The Shenango Iron & Steel Co., Wheatland, Pa., which took over the old Continental rolling mill recently, has decided to make additions and improvements that will cost nearly $100,000. Ten and eighteen-inch mills will be installed as well as a jobbing plate mill. The organization of the company has not yet been perfected, and not until this is done will contracts for the new mills be let.

Within the past two years the R. D. Nuttall Co., of Pittsburg, has been making large expenditures for new machinery, in line with its purpose to operate the largest and most complete gear-cutting plant. Recently the company has found it necessary to add 23 of the latest type gear cutting machines, as well as additional worm gear machinery, mill lathes, etc. This is regarded as the largest individual order that has been placed for this type of machines.

The American Rolled Gear Car & Wheel Co., 407 Arrott Bldg., recently incorporated, proposes to manufacture a gear wheel that is rolled or pressed instead of being cut. The site for the plant has not been selected, but will be somewhere in the vicinity of Pittsburg.

General Industrial Notes:—

The contract for the supply of thirty locomotives for the Imperial Japanese railways, on which bids were recently made on this side, will be filled in Germany, owing to European competitors quoting figures fully 20 percent lower than those submitted by Americans.

One of the foundries of S. L. Moore, Sons & Co., Elizabeth, N. J., recently shut down by order of the receiver of the United States Shipbuilding Co., has been reopened.

The Mahoning Foundry & Machine Co., Youngstown, O., has just finished a large machine for the Youngstown Iron & Steel Roofing Co. The new machine, which weighs 145,000 tons, will be used for manufacturing expanded steel metal laths of which the roofing company makes a specialty.

The National Steel Foundry Co., of New Haven, Conn., has recently purchased from the Ball Engine Co., Erie, Pa., a 400-h. p. tandem compound engine for direct connection to a 250-k. w. generator. The Ball Engine Co. has also furnished three 300-h. p. simple engines direct connected for the Detroit Iron & Steel Co.

The Muncie Gas Engine & Supply Co., of Muncie, Ind., manufactures gas and gasoline engines from 10 to 75 h. p.; also drilling tools of all descriptions and oil well supplies. About 100 men are employed in the company's shops, the industry having developed notably in the past year. The company is also a large dealer in oil and gas well supplies.

The new mill of the Sylvan Steel Works of the Republic Iron & Steel Co., at Moline, Ill., was put in operation last week. It is a ten-inch continuous roughing mill with an eight-inch finishing train.

The Reliable Gas Machine & Mfg. Co., Davenport, Ia., recently incorporated, has rented a building and is now operating it for manufacturing purposes.

The machinery has been installed in the plant of the Toledo Co-operative Foundry Co., Toledo, O., and the plant will be in operation next week.

The United States Foundry & Supply Co., a large jobbing establishment, Chicago Heights, Ill., has begun business.

The National Rolling Mill Co., started its muck mill at Hartfort, Ind., Aug. 25, after an extended shut-down. An accident, however, will delay work for a number of days.

The Louisville & Nashville Railroad has decided to use Birmingham steel in laying tracks in the Birmingham district. Aug. 28, the Tennessee Coal, Iron & Railroad Co. commenced the shipment of an order for 4,000 tons of steel rails to the Louisville & Nashville Railroad Co., at Birmingham.

The Nebraska & Iowa Steel Tank Co., Omaha, Neb., has rented a building and begun the manufacture of patent steel tanks. The company was organized at Peabody, Kan., and Omaha was decided upon as a desirable location for the plant.

The Heating, Ventilating & Foundry Co., which recently moved its plant from Wellsburg to Wheeling, W. Va., occupies a two-story brick, equipped with latest improvements. The building is arranged on the continuous plan, the raw material being unloaded at one end and the finished product shipped out at the opposite end.

The Brotherhood of Boiler Makers and Iron Shipbuilders at Baltimore has entered into an agreement with its employers included in the Ship & Marine Engine Builders' Association whereby the wages demanded for overtime on new work are decreased from two and three quarters to one and a half time the pay received for the usual working hours. Double pay is received for overtime on other work. The action was taken by the Baltimore workmen on the representation of their employers that it would be impossible to compete with out-of-town firms at the existing rate of wages demanded for overtime. It is agreed by the union workmen that they will not under any consideration enter into a sympathetic strike. The companies will, when it is possible, employ only union men. Differences to be settled by arbitration.

The Engineer Publishing Co., of Cleveland, announces the purchase of *Steam Engineering* and its consolidation with the *Engineer* beginning with the issue of Sept. 1. The *Engineer* will be published hereafter in Chicago.